

MODERN Machine Shop

VOLUME 17 • NUMBER 8

JANUARY, 1945

Contents

HOWARD CAMPBELL, Editor

Published monthly by
GARDNER PUBLICATIONS, Inc.
431 Main St., Cincinnati 2, Ohio

DON G. GARDNER
President and General Manager

JOHN M. KRINGS
Advertising Manager

G. M. FILLMORE
342 Madison Ave.
New York 17
Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago 11
Superior 2290

CHARLES H. DEILY, JR.
310 West Durham St.
Philadelphia 19
Chestnut Hill 1198

RALPH M. FRENCH
627 Union Commerce Bldg.
Cleveland 14, Ohio
Main 2866

Member



Printed in U. S. A.

Copyright 1944 by
Gardner Publications, Inc.

CONTENTS

Mass Production in Ship-Building.....	124
By Howard Campbell	
Fatigue Failures May Be Blamed On You.....	142
By H. A. Bolz	
Recent Progress In High Speed Tapping, III.....	156
By C. W. Hinman	
Films Valuable In Training Program.....	178
By Lyne S. Metcalfe	
Look for the True Rake.....	190
By M. Kronenberg	
Ideas from Readers	
—Improved Stop Collar, by W. L. Stevens.....	198
—Thumb Tack Extractor, by C. F. Fitz.....	198
—Special Filing Machine for Stator Core Slots.....	200
—Ingenuity Doubles Production on Burring Operation.....	208
—Turntable Gage Rack.....	212
—Simplifies Bore Concentricity Checks.....	214
News of the Industry.....	222
New Shop Equipment.....	226
Catalog Library.....	388
Services Directory.....	390
"Where to Get It".....	392
Cartoon.....	396
Over the Editor's Desk.....	398
Index to Advertisements.....	401



ARMSTRONG

Carbide

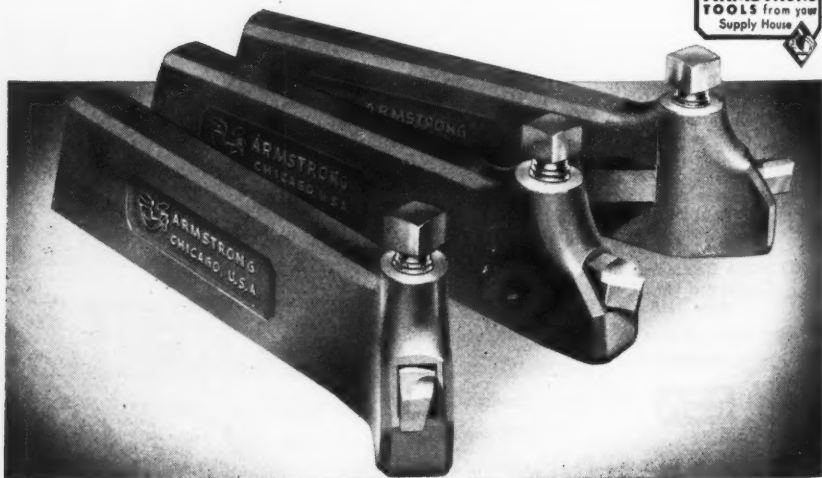
TOOL HOLDERS

ARMSTRONG Carbide TOOL HOLDERS have been specially designed and engineered for use with Carbide-tipped tool bits, and embody the special characteristics essential for the efficient use of carbide-tipped cutters, namely: great strength, extreme rigidity and close-up support for the cutting edge.

The ARMSTRONG Carbide TOOL HOLDERS System makes the use of carbide tools practical for everyday operations in tool rooms, maintenance departments and machine shops. Each takes interchangeable carbide-tipped tool bits ground to different cutter shapes... each tipped cutter can be used in a "Straight Right Hand Off-Set" or "Left Hand Off-Set" Tool Holders. Hence a small investment in ARMSTRONG Carbide TOOL HOLDERS and carbide-tipped cutter bits can turn those hard-to-do-machining operations into "just another routine job," changing losses into profits.

ARMSTRONG Carbide TOOL HOLDERS and Armide or other Carbide-tipped cutter bits are now available at leading industrial supply houses.

WRITE FOR BULLETIN



ARMSTRONG BROS. TOOL CO., "The Tool Holder People"

328 N. FRANCISCO AVE.

CHICAGO 12, U. S. A.

Eastern Warehouse and Sales: 199 LAFAYETTE ST., N. Y. 12, N. Y.

MODERN Machine Shop

JANUARY, 1945

VOL. 17, No. 8

CINCINNATI, OHIO

We Present ---

— as the feature article in this month's issue—an outline of the mass production methods employed by the California Shipbuilding Corporation in the building of Liberty and Victory Ships.

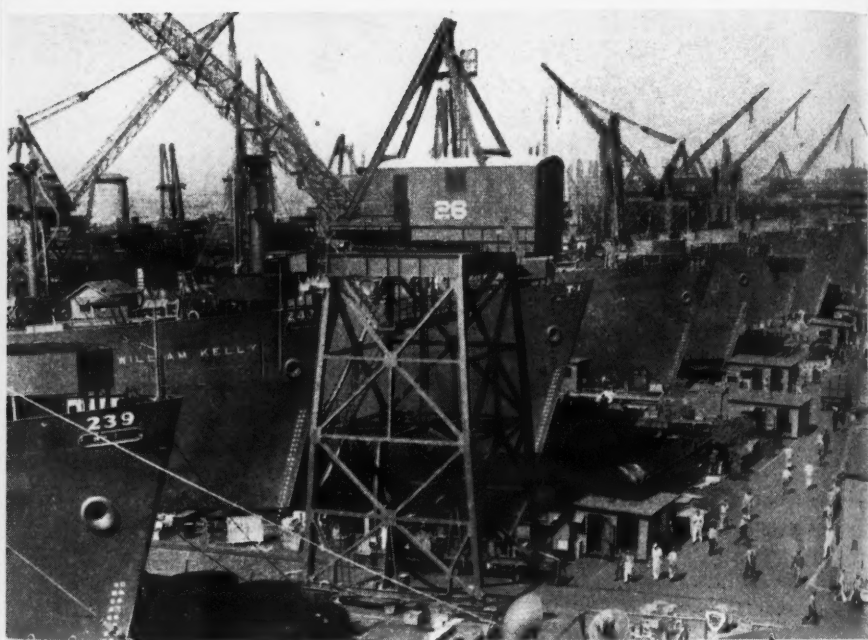
— on page 142—"Fatigue Failures May Be Blamed On You," an article by H. A. Bolz, Associate Professor of Mechanical Engineering, Purdue University, telling why the fatigue failure of metal parts subjected to repeated stresses is not the sole responsibility of the engineer, but of every foreman, production operator, inspector, and materials handler as well.

— on page 156—the third article in the series on "Recent Progress in High Speed Tapping," by C. W. Hinman, Designing Engineer. This article discusses the manner in which tapping efficiency is affected by the weight of the fixture used, also the tapping of plastics and the grinding of taps. Various types of fixtures for use in performing tapping operations are also illustrated and described.

— on page 178—Lyne S. Metcalfe's article "Films Valuable In Training Program"—an outline of the methods employed by the Scintilla Magneto Division of Bendix Aviation Corporation for training mechanics.

— on page 190—an article by M. Kronenberg, Research Department, The Cincinnati Milling Machine Company, telling why one tool angle by itself does not describe the rake of a face mill cutting tooth or of a lathe tool unless that angle is the result of three components.

— on page 198—the usual "Ideas From Readers" department followed by the "New Shop Equipment" section, cartoon, and other features.



Mass Production in Ship-Building

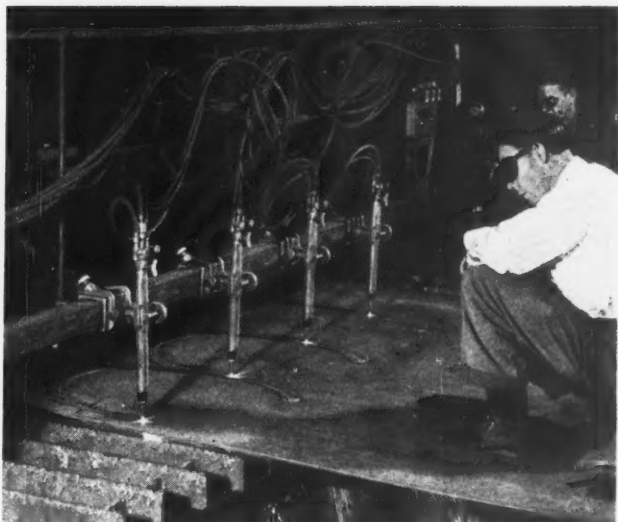
An outline of the methods employed by the California Shipbuilding Corporation in the building of Liberty and Victory Ships

By HOWARD CAMPBELL
Editor, Modern Machine Shop

FOR a war overseas, the first need of Uncle Sam is for ships; ships to carry men, guns, ammunition, food, combat vehicles, and even to carry aircraft. Ships alone could not win a war, but without an ample supply of ships we practically would be at the

mercy of our foes. So when our government became definitely aware that the catastrophe that had overtaken Europe was spreading to this side of the ocean, the first consideration was the expansion of shipbuilding facilities to meet the anticipated

Fig. 1—A Gang Cutting Torch Machine is Used for Cutting Duplicate Sections from Steel Plate



need for merchant ship tonnage.

At the outset of the emergency program, according to Rear Admiral Howard L. Vickery, U. S. N., the proposed "Liberty" ships were scheduled on a basis of 180 days from keel-laying to delivery. After the Jap attack on Pearl Harbor it became obvious

that an immediate and tremendous expansion of the shipbuilding program would be necessary. New shipyards were built and scheduling of ship construction was stepped up to 105 days between keel laying and de-

livery. This schedule was not only met, but passed, and in December, 1943, 118 Liberty ships were delivered under 40 days after keel laying, the time being about 28 days from keel laying to launching.

Among the greatest of the American shipyards is that of the California Shipbuilding Corporation at Terminal Island, California. The yards cover 151 acres of ground, with 14 ways available for ship construction. Operating at full blast, 24 hours a day, with



Fig. 2—Drilling Machines Suspended from Overhead Beams Make it Possible to Drill Holes Over a Wide Area of Ship-Plate

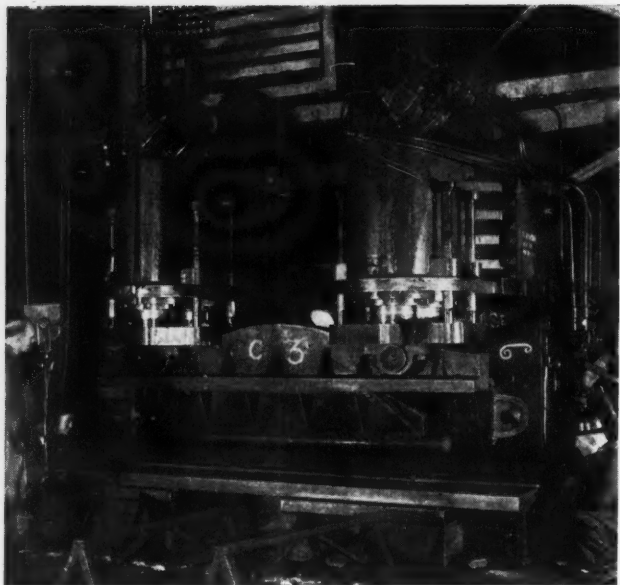


Fig. 3—Hydraulic Forming Press Used to Bend and Form Ship Plate

and many sub-assembly buildings. Some of these are complete, substantial buildings; others consist mostly of roofs and floors, sidewalls being unnecessary due to the temperate climate. Some of the lofts are built with roof sections supported by sidewall frames which can be moved over that

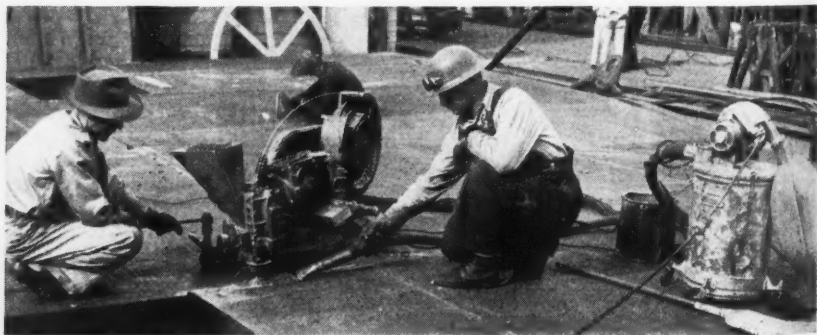
three shifts of workers, the yard has employed as many as 40,000 people at one time in the job of supplying Uncle Sam with shipping to carry oil and munitions to the boys at the front.

Besides the ways, yard facilities include the office, stores buildings, plate shop, machine shop, loft, pipe shop,

part of the floor where work is in progress and where protection from sun or rain is necessary. Canvas curtains are also attached to the sidewall frames for use when required.

Huge Gantry cranes, of which there are 33, are mounted on tracks that parallel the ways so that beams and materials can be swung into position

Fig. 4—Welding Seams in Deck Plates, Using a "Unionmelt" Welding Machine



hydraulic
press Used
and Form
Plate

ny sub-
build-
ome of
re com-
stantial
others
mostly of
d floors,
being
ary due
imperate
Some of
are built
sections
by side-
r a mes-
can be
ver that
k is in
on from
vas cur-
he side-
quired.
ch there
ks that
ms and
position

ne



ary, 1945



Fig. 5—A Special Positioner in Use. With this Positioner, the Work can be Rotated so that Both Sides can be Brought into Position for Down-Hand Welding

wherever needed. Spurs from a near-by railroad extend to the several stores, buildings, machine shop, plate shop, and other buildings so that raw materials coming into the yards can be delivered at the points where they are to be used, eliminating unnecessary handling.

The ships built by "Calship" during the first part of the emergency were of the "Liberty" type, powered by Hendy 2,500 h.p. reciprocating engines, and were of 10,000 tons displacement. In May of 1943, however, Calship was requested by the Government to start plans for the production of the new turbine-powered "Victory" ships. The Victory ships have the same displacement, but are 14 feet longer and are faster, due to the higher efficiency of the 8,500 steam turbine engines. Victory ships are 455 feet 6 inches long, and the builders are given an allowance of

4½ inches on this dimension. The task is complicated by the fact that when a welded keel has cooled, it is about eight inches shorter than when it was hot.

Welding plays the most important part in the construction of these ships. The extent of the use of welding has been progressively greater as the advantages in weight-saving and rapidity of construction became apparent, and at Calship welding is used wherever possible. Welding has also made possible an important saving in steel, a fact which became obvious during the critical periods when steel production barely met the demands of the war effort. The resultant increase in the dead-weight carrying capacity of the ships has also been important.

The yards at Calship were built to utilize to the fullest extent the mass production principles to which welding is peculiarly suited. As far as

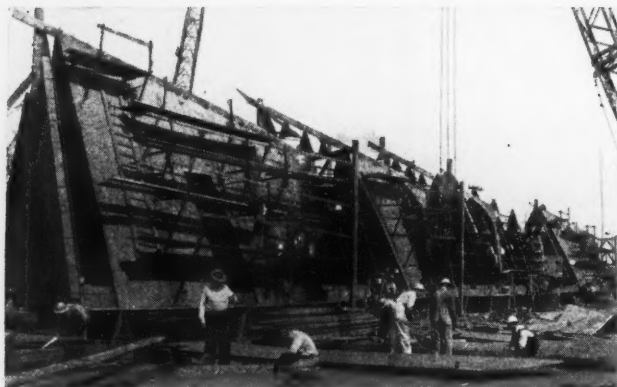


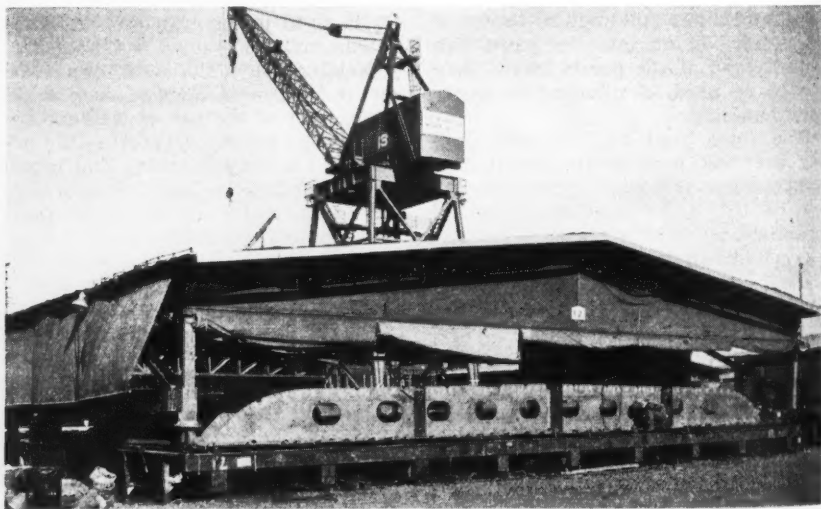
Fig. 6—Unit Construction, Such as Shown Here, Reduces Ship-Time on Ways, Permits Maximum Employment, and Increases Production

possible the ship structure was divided into sub-assemblies which could be fabricated at various points in the yards other than the ways, then moved to the ways for final assembling. This system enabled the use of the maximum number of workers on assembly and erection work, made possible a substantial reduction in the number of days between

Welding operations at Calship are divided into six major divisions; the plate shop, sub-assemblies, shipways 1 to 7, shipways 8 to 14, outfitting, and pipe department. In addition, a considerable amount of welding is done in the hull prefabrication, sheet metal, boiler assembly, machine shop, and construction and maintenance departments.

the laying of the keel and the launching of the ship, and a corresponding increase in the production schedule.

Fig. 7—Skid Equipped with Roof Mounted on Rollers for Protection when Needed



of the
d the
of the
a cor-
ing in-
the pro-
cedure.
ship are
ns; the
shipways
fitting,
tion, a
ing is
sheet
e shop,
nce de-

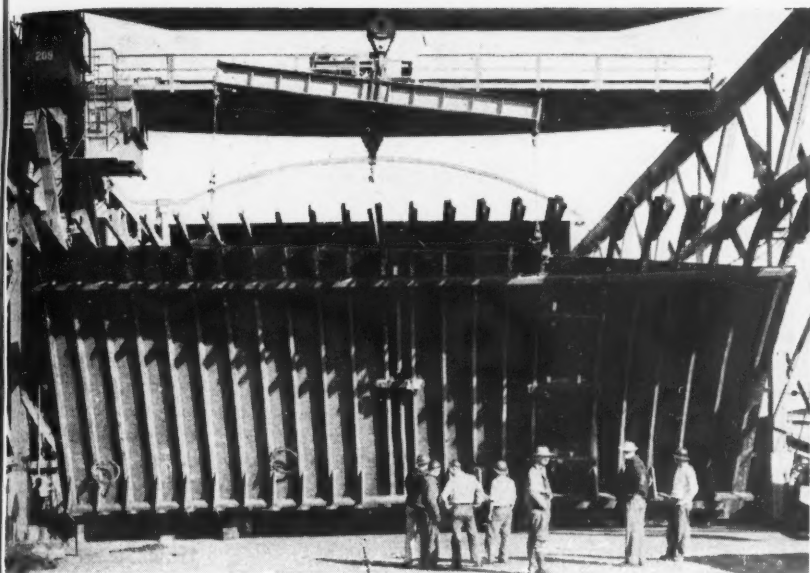


Fig. 8—Overhead Crane Picking up a side shell Section that has been Fabricated in Horizontal Position, Making for Convenience and Encouraging Good Workmanship

A Liberty hull requires about 225,000 feet of manual weld, apportioned approximately as follows: plate shop, 14 per cent; hull prefabrication, 1 per cent; shipways, 40 per cent; outfitting, 4 per cent. A Victory ship requires 248,300 feet of manual weld, plus 34,000 or more feet of machine weld on each ship. The welders at Calship represent nearly one-fourth of the total personnel, and altogether lay 142,000 feet of manual weld per day, requiring 75,000 to 80,000 pounds of welding electrodes.

In addition to the manual welding referred to above, the yard operates 35 Unionmelt automatic machines which are used for welding flat position butt welds. These machines are capable of producing over 20,000 feet of weld per day with a crew of two operators to each machine. The amount of Unionmelt welding now required for each hull amounts to about 34,000 feet.

Typical of Calship's enormous increase in efficiency during the emergency is the increased productivity of the welders. In the early months of production the average was 20 feet of weld per welder per day; more recently the average has been over 40 feet. This doubling of efficiency can be credited to improved skill, improved methods and welding machines, and to good supervision by the shipyard engineers and executives—all of which have made possible, in spite of a greatly increased pay scale in the yards over World War I, a cost of \$160 per dead-weight ton today as against \$210 during the last war.

One of the most difficult of the many problems resulting from the rapid expansion of the shipbuilding program has been that of training welding operators. An all-around good welder cannot be trained in a short space of time, although a

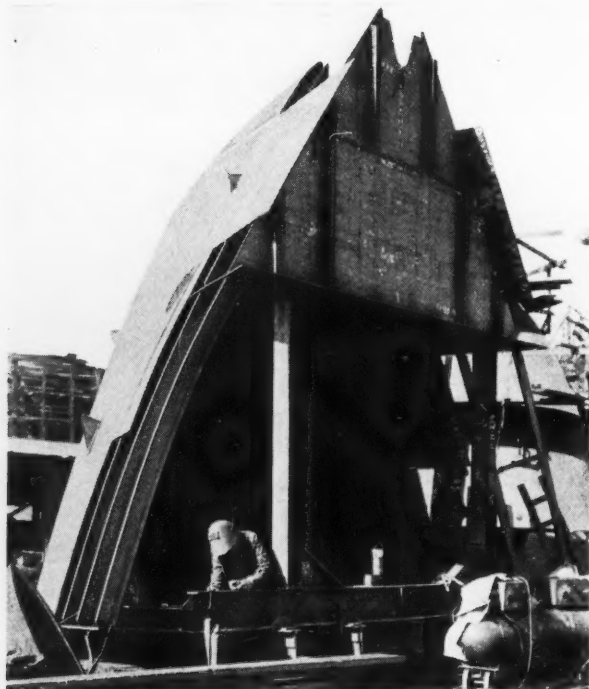


Fig. 9—Building an upper after-peak; This is Another Example of Unit Construction

trainee can be taught to perform a certain type of job quickly and can then be put to work on simple production welding. As his skill increases he can be taught vertical or overhead welding, taking the various tests required as he progresses.

At Calship the student welder is

ing plates together.

When a trainee's instructor thinks he is good enough, he is permitted

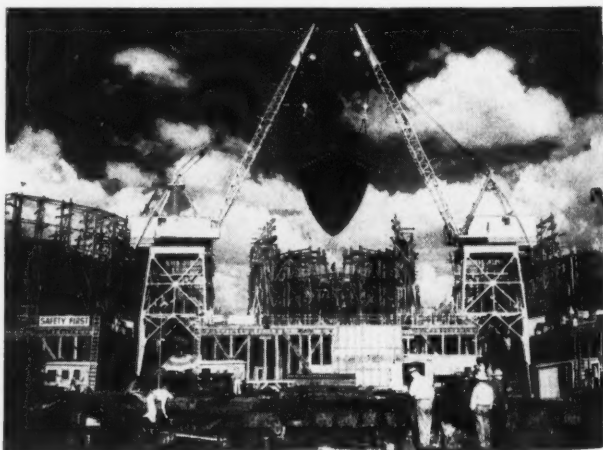


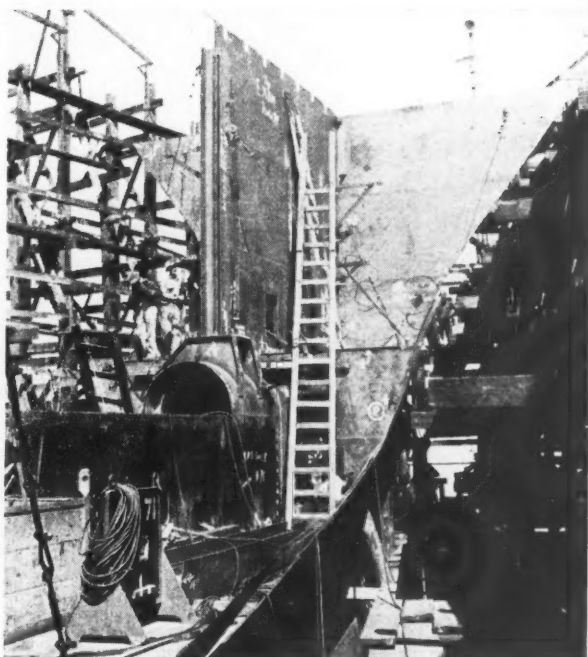
Fig. 10—With the Aid of Two Gantry Cranes, a Pre - Fabricated Forepeak is Swung into Position in a Part-Completed Ship

ing an up
ak; This is
mple of Uni
uction

Fig. 11—Fan-Tail Section of One of the Ships in Process of Construction

to school
s during
ure peri-
mbined
work in
g booths.
achines of
n use in
e provid-
the stu-
become
th the
the con-
general
elding is
, as well
ons for
ght sizes
electrodes
in sew-
r thinks
ermitted

to take his test. The only grades given are those indicated by the bending machine in which two "coupons" of welded plate welded by the student, are bent, one each way. If the weld breaks, the trainee goes back for further instruction and practice; if the coupon doesn't break, the trainee goes into the yard with a rating as a two-position welder. Promotion from new-hire trainee to journeyman is as fast as the welder's ability permits, and demands for trained welders make it imperative that welders be qualified as fast as possible.



The remarkable increase in welding efficiency during the past two years has resulted from a combination of

factors, some of the more important of which are (1) the increased use of large diameter electrodes, (2) the use of positioning devices, (3) the increased use of "hot" or "fluid-type" electrodes, (4) the develop-

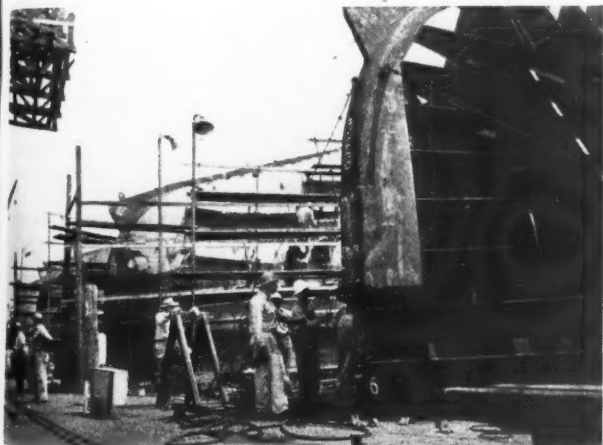


Fig. 12—General View in the Forepeak Assembly Area

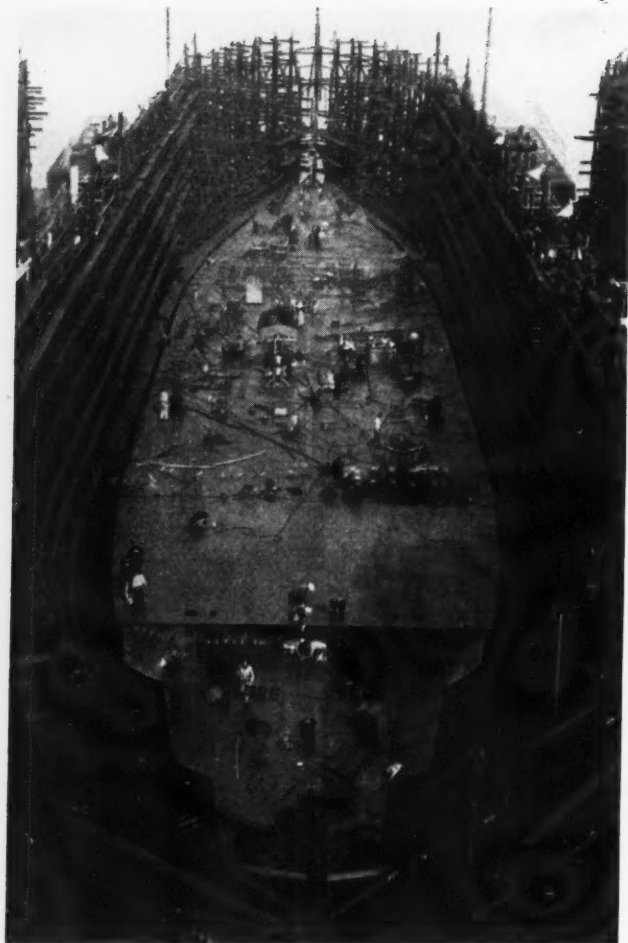


Fig. 13 — Laying the Bottom Deck in a Ship

tically the same, and the use of electrodes in diameters from $\frac{1}{8}$ to $\frac{1}{4}$ inch diameter has steadily increased. The use of larger - diameter electrode has also made possible the use of a greater proportion of longer-length electrode, with corresponding increases in operator efficiency and reduction of waste. It has also made necessary the replacement of low capacity equipment with 400 - ampere DC and 500 - ampere AC machines.

The use of positioning devices in the plate shop has had noticeable effect. Before the introduction

ment of special welding techniques, (5) the relocation of work among departments to provide for a greater proportion of work in the flat and horizontal positions, and (6) the increased use of alternating current welding transformers.

In these past two years the use of electrodes under $\frac{1}{8}$ inch diameter has gradually decreased; the use of $\frac{1}{4}$ inch electrode has remained prac-

of positioners and welding jigs, the work was done largely in the vertical and horizontal positions. Under these conditions, average production per man was approximately 55 feet per shift. With the introduction of welding positioners and larger-diameter electrodes, this production increased steadily to about 105 feet per man per shift. The positioners used are both the universal type as made by

RECONVERSION PROBLEM SOLVED!

**American H-2-30
STANDARD BROACHING
MACHINE ADAPTED TO
MANY "SPECIAL" JOBS!**



ABOVE: Standard American H-2-30 Horizontal Broaching Machine reconverts easily from war to post-war production.

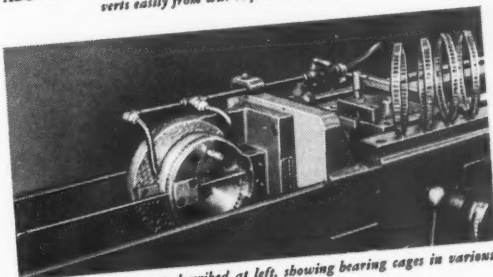
This standard American broaching machine, designed for use in many types of war production, is cheaply and quickly converted to peacetime manufacture. Considerably less expensive than especially built equipment, it will perform a large number of "special" jobs accurately and economically.

The set-up for one such job is illustrated at the right: To broach rectangular holes in aircraft bearing cages. Two opposite holes are broached at each pass. Starting with a drilled hole, three passes, each with a slightly larger broach, are required for each hole. Exceptional finish at a high production rate is assured.

American's complete broaching service—machines, tools, and engineering—is available to speed your production. Let American engineers help solve your precision manufacturing problems with standard machinery that will save you valuable time and money. Write for further details.



Use proper and sufficient lubrication when broaching. It is cheap life insurance for broaching tools.



Close-up view of set-up described at left, showing bearing cages in various stages of completion.

MEMBER
**BROACHING TOOL
INSTITUTE**

American
**BROACH AND
MACHINE CO.**

ANN ARBOR, MICHIGAN
BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY



manufacturers of this equipment, and highly specialized types designed and built in the yards.

The increased use of "hot" or "fluid" type electrodes has been influenced to a large extent by the fourth factor; the development of new welding techniques. A study of the "Fleet Fillet Welding Technique" of the Lincoln Electric Company brought out some points which have been adopted with excellent results. The adoption of the procedure indicated has resulted in an increase in productivity per man of 80 to 90 per cent for continuous flat and horizontal fillet welds. Techniques have been developed to build $\frac{3}{8}$ -inch fillet welds to size in one pass.

In order to take advantage of the increased speed and to produce sounder welds, a continuous effort has been made to increase the percentage of sub-assembly and prefabrication work. Overhead welding has been cut to the minimum by fabricating sub-assemblies in the inverted position and then righting them to complete the job. However, the size of many of the sub-assemblies now fabricated makes complete positioning highly impractical.

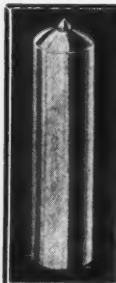
The increase in welding efficiency obtained with the use of alternating current transformers is due largely to the elimination of troublesome "arc blow." In addition, this equipment lends itself admirably to the use of

"hot" or "fluid" type electrodes and to the high speed techniques which have been developed.

Production from Unionmelt machines has remained almost constant, according to yard officials, at approximately 225 feet per machine per shift. Considering two operators to each machine, as is usually the case, the labor cost is about equal to manual welding in the shop. However, the advantages gained from the elimination of beveled edges of plate and the generally higher quality of weld are reflected in considerable economy in overall man-hours and materials. Unionmelt is said by the welding supervisors to be unequaled in economy for its application to flat position butt welds.

Plant facilities include a general testing laboratory which is set up for making a majority of the usual chemical and physical tests on steels under the direction of the welding engineer. Physical testing for all yard departments is handled, but the laboratory was developed primarily to ensure the necessary quality in welding. All operator qualification tests are given under the direction of the laboratory, as well as tests for the qualification of electrodes.

Quality control is maintained by studies of trepanned test plugs taken from actual production welds, cut and processed in the laboratory. All shipments of welding electrodes received



S-88 DIAMOND DRESSERS

FOR GENERAL SURFACE GRINDER WORK

Price \$5.00 each
Set in $\frac{3}{8}$ Shank

Six for \$25.00
Limited time only

SOMERSET INDUSTRIAL DIAMOND CO.

220 VIRGINIA STREET

HILLSIDE, N. J.

des and
s which

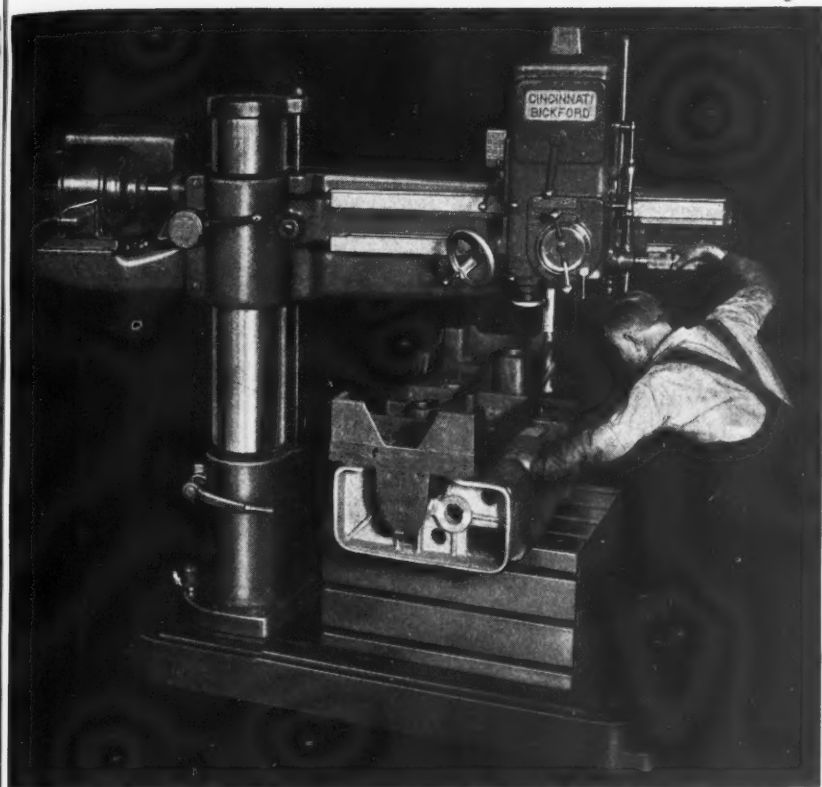
elt ma-
onstant,
at ap-
hine per
ators to
the case,
to man-
owever.
he elim-
ate and
of weld
economy
aterials.
welding
n econ-
position

general
t up for
l chem-
s under
engineer
depart-
oratory
ure the
All op-
given
ratory.
ication

ed by
taken
ut and
ll ship-
received

J.

y, 1945



LARGE jobs . . . SMALL machines . . . BIG time savers . . . LITTLE overhead

In other words, drilling efficiency is the result of the Cincinnati Bickford Tool Company's exclusive specialization, for over half a century, in Radials and Uprights.

The Super Service Radials are available in sizes from 3 to 8 foot arms and the Super Service Uprights in 21", 24" and 28" sizes.



For further information on standard or special metal drilling machinery adaptable to your requirements write us today.



THE CINCINNATI BICKFORD TOOL CO.

OAKLEY · CINCINNATI 9 · OHIO · U. S. A.

January, 1945

MODERN MACHINE SHOP 135

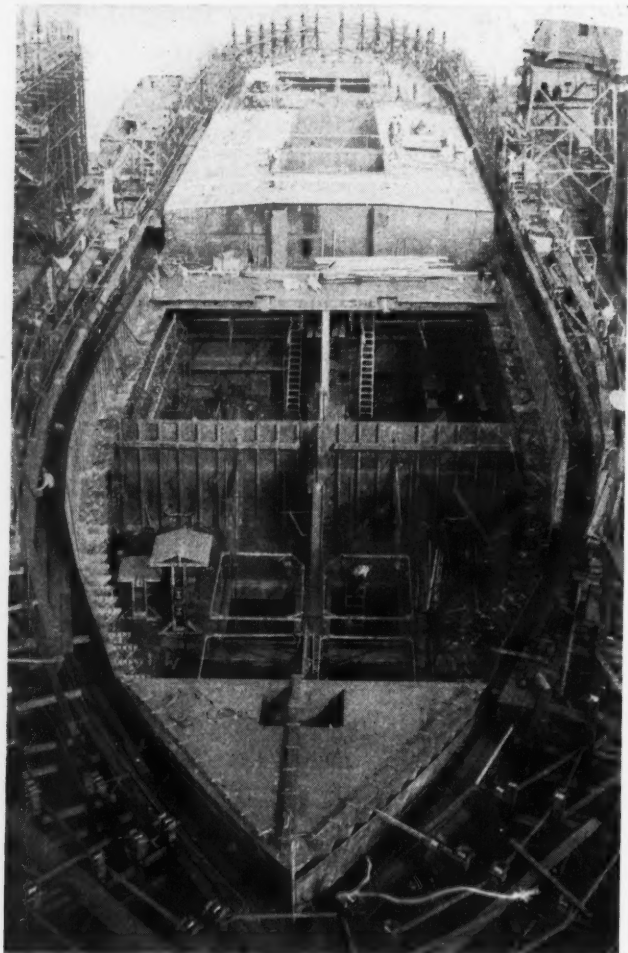


Fig. 14—Liberty Ship
in Partially-Com-
pleted State

article is a view of the Calship ways showing a number of ships nearing completion and providing a general impression of shipyard activities. An interesting comparison can be made between the vast hulls of the ships, the huge Gantry crane in the foreground, the one-story foremen's offices at the head of the ways, and the workers.

The illustration Fig. 1 shows the operation of cutting oval plates from a heavy steel sheet, for which operation a gang cutting torch

are subjected to weldability tests, which alone has saved hundreds of man-hours formerly lost in the repairing of unsound welding. While the influence of these factors in production efficiency is difficult to show, it is believed that the laboratory has paid for itself many times over in savings in yard operation alone.

The illustration at the head of this

machine is used. At the opposite end of the cross-bar, not visible in the picture, is the stylus which, following a pattern of the oval desired, controls the movement of the bar carrying the torches. This machine can be employed for multiple cutting of all shapes, by use of a magnetic tracing head on a precision-built steel Template.

CINCINNATI SHAPER CO.

CINCINNATI OHIO U.S.A.
SHAPERS · SHEARS · BRAKES



TWIN EFFICIENCY

Write for Catalog B-2, a booklet illustrating and describing Cincinnati Press Brake applications.

The efficiency of these Reliance Trailers on the road and the efficiency of Cincinnati Press Brakes on the production line make them twins in performance.

Trailers are one of the many products in the field of transportation on which Cincinnati Press Brakes speed the job.

Whether it flies . . . swims . . . or rolls . . . you will find Cincinnati Press Brakes in the production line . . . forming . . . punching . . . accurately and economically.

Photos courtesy
Reliance Trailer & Truck Co., Inc.



Where necessary, rivet holes are drilled in ship plates with drilling machines such as those shown in Fig. 2. These machines are suspended from overhead beams which make it possible to move the machines about over a wide range of area.

In Fig. 3 the operation of forming plates is shown. The machine used for this operation is hydraulically operated, and is capable of a pressure of 1,000 tons per square inch. Plates of any thickness can be formed in this machine.

The Unionmelt machine shown in Fig. 4 is being used to weld a seam in the plates for a ship deck. The operator at the right is operating a suction cleaner which picks up the unused "Unionmelt" material and returns it to a hopper for reuse. With the Unionmelt machine, steel plates up to 2½ inches thick can be welded in one pass and plates up to 5 inches thick can be welded using one pass on each side.

In Fig. 5 is shown one of the special positioners made in the Calship yards for use in welding longitudinal and transverse hatch girders. By using this positioner, the work can be rotated so as to bring all seams into position for down-hand welding, thus ensuring thorough penetration and a good weld.

The bow of the ship is fabricated by unit construction, as shown in Fig. 6. Here several of the units are shown in process, aligned so that all

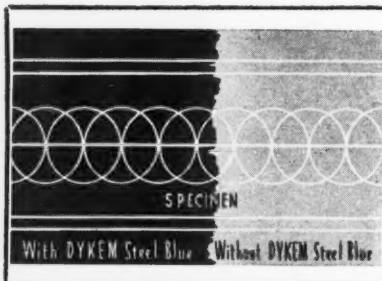
welding can be done in "down-hand" position. When finished, each bow unit is moved to its ship by means of the Gantry crane.

Smaller units are fabricated on skids such as that shown in Fig. 7, which is equipped with a roof that can be moved into position over the work when necessary due to sun or rain. The side-wall posts are mounted on rollers which ride on a track on either side of the skid.

In Fig. 8 an overhead crane is shown picking up a side shell section which has been fabricated in the horizontal position. The entire section will be moved to the ship for which it is intended and swung into position in the ways.

The illustration Fig. 9 shows another example of unit construction in the process of fabrication; in this case an upper after-peak. A view of the Gantry cranes swinging a prefabricated forepeak into position in one of the ships on the ways is shown in Fig. 10, and Fig. 11 shows a fan-tail section in the forepeak assembly area.

In Fig. 13 the reader sees exactly what he would see if he looked down into one of the ways just after the bottom deck of a new ship had just been laid. The workmen are busy "sewing" the deck plates together with electrode, Fig. 14 shows a view of a similar ship partly completed.



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301 F. NORTH 11th ST.
(In Canada: 444 Pacific Av., Toronto, Ont.)

ST. LOUIS, MO.



**THE PAYROLL
DOLLAR**
buys more



...WHEN "AMERICAN" MULTI-PRODUCTION LATHES ARE USED

HERE, for example, is an "American" in one of our most prominent shops actually producing four (4) times more work than the fairly modern machine it replaced. In hundreds of plants "American" Multi-Production Lathes are lightening the burden of higher wages, shorter hours, increased taxes and inexperienced operators. That is why "Americans" are the choice of cost-minded production men. The many productive features responsible for such results are clearly illustrated and described by our new bulletin No. 445

THE AMERICAN TOOL WORKS COMPANY
LATHES • RADIALS • SHAPERS
CINCINNATI, OHIO, U. S. A.

Fatigue Failures May Be Blamed On You

By H. A. BOLZ

Associate Professor of Mechanical Engineering, Purdue University

ALTHOUGH the fatigue failure of metal parts subjected to repeated stresses constitutes one of the engineer's most troublesome problems, the responsibility for mastering this problem is not solely the engineer's. Each foreman, production operator, inspector and material handler should assume the obligation of understanding enough about the nature of the fatigue phenomenon and its causes

and cures to work intelligently with the engineering staff to reduce such failures—especially in combat and other vital equipment—to an absolute minimum.

To appreciate the magnitude of this problem, one has but to learn of the great quantities of aircraft parts which, while apparently in perfect condition, have been removed from service because they have been found

by periodic inspection to harbor invisible defects which will lead to early fatigue failure. Propellers and certain other aircraft parts are removed and examined after a specified number of operating hours to avoid the hazards involved by fatigue failures which probably would ensue if the

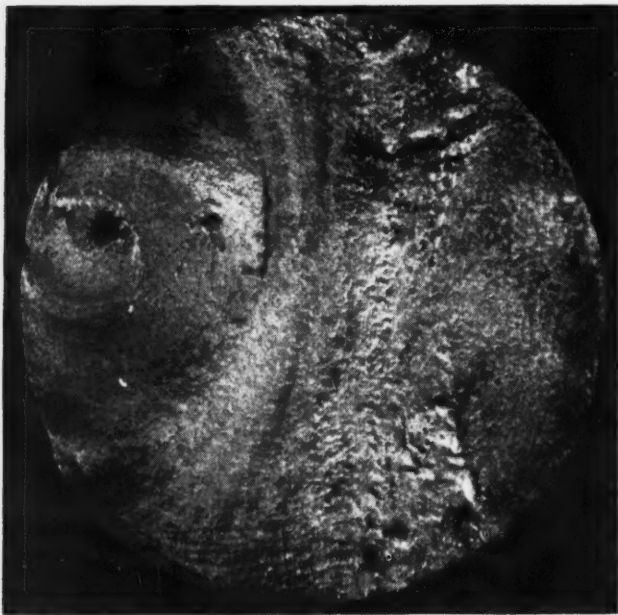
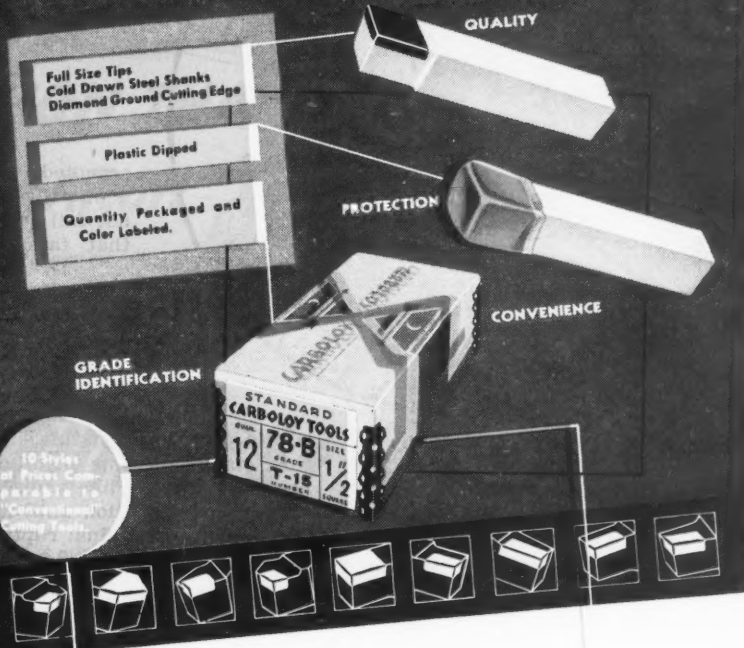


Fig. 1—Enlarged photograph showing surface of axle break caused by fatigue failure. (Photo by C. L. Brown.)

STANDARD

CARBOLLOY TOOLS



TODAY'S BEST "BUY" IN CARBIDES . . .

Thanks to modern "quantity production" methods—turning out MILLIONS of STANDARD Carbide Tools annually—you get top-quality carbide tools at prices comparable to all other cutting tool materials (actually lower than H.S.S. in sizes $\frac{3}{4}$ " sq. and over).

Carbide "STANDARDS" have full-size long-life tips—strong, cold-drawn steel shanks—and diamond ground, ready-to-use, cutting edges. Entire shank colored for instant identification. Every tool-tip plastic dipped for shipping protection. Standard quantity-packaging with color-label grade identification for convenient ordering and handling.

Priced at each and up 5 grades, 10 styles for cutting all metals. For your best "buy" in carbides, ask for catalog GT-175R.

STANDARD

CARBOLLOY
TRADE MARK

TOOLS

CARBOLLOY COMPANY, INC. • 11143 E. 8 MILE BLVD. • DETROIT 35, MICHIGAN
Chicago, Cleveland, Houston, Los Angeles, Milwaukee, Newark, Philadelphia, Pittsburgh, Thomas, Conn.

January, 1945

MODERN MACHINE SHOP 143

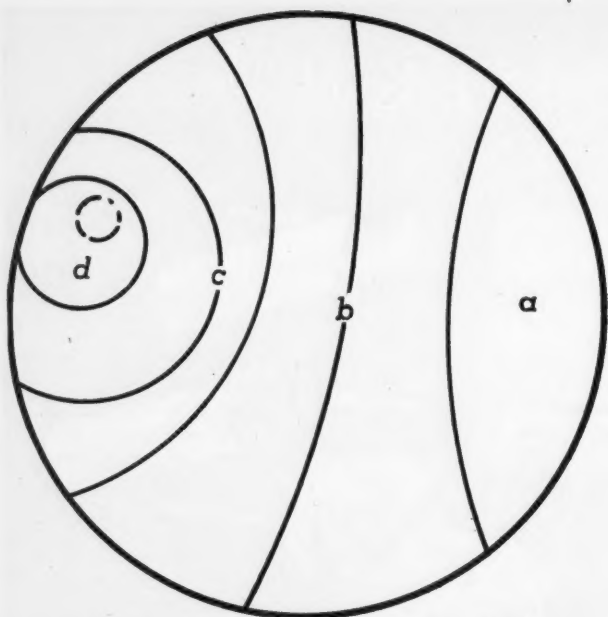


Fig. 2 — Diagram of Fractured Axle Surface. a — Original fracture, worn smooth by rubbing of contacting surfaces; b — center of area containing lines indicating successive fractures; c — area untarnished but dull and velvety; d — bright granular surface fresh fracture.

service period were continued indefinitely. If such expensive practices are justified, it is certain that everyone concerned with the design and production of high speed, long service parts must appreciate the factors affecting fatigue and endurance.

Nature of Fatigue Failures

A clear understanding of the nature of the fatigue failure in machine and structural parts may be attained by studying a typical and somewhat familiar case. Among the demonstration specimens used in our machine design classes at Purdue University is a 1932 Chevrolet axle which broke one morning in 1939. Fig. 1 is a photograph of the actual fracture. This axle apparently did its job satisfactorily for seven years and then suddenly gave up. "Fatigue failure" is the term that probably would have been applied to it, indicating that the part finally might have tired out and broken. This term, while generally

accepted, is a misnomer. This axle did not fail suddenly on that fatal morning in 1939. The probability is that it started to "go" while the car was being driven off the assembly line, for in reality a fatigue failure

is of a progressive nature. The fracture starts at some point of weakness and spreads like a disease with each stress repetition until it reduces the section to the final rupture point.

The illustration Fig. 2 is a diagrammatic sketch of the fractured surface on this axle. As a geologist traces the history of a given locality by examining the indigenous rock formations, so may we follow the progress of this fracture by studying the lines and other configurations which make up its surface.

An examination of the fresh fracture showed area (a) to be smooth apparently from rubbing against its mating face, but tarnished to a rusty color; area (b) between (a) and (c) diminished in smoothness and tarnished from (a) toward (c) and covered with successive fracture lines; area (c) untarnished but decidedly dull and velvety; area (d), the final fracture, obviously fresh with a bright granular surface. This granular

Diagram
Axle
Original
smooth
of con
places; b
area con
es indic
sive fra
reg unla
dull an
— bright
surface
ature.

a mis
axle di
denly o
morning
the prob
that i
o" while
s being
e assem
in real
e failure
the frac
f weak
use with
reduces
re point
Diagram
surface
t traces
by ex
forma
progress
the line
h make
sh frac
smooth
inst its
a rusty
and (c
tarnish
covered
s; area
ly dull
al frac
bright
ular on

ary, 194

NO "DOCTORED-UP"



VERSION OF AN OLD IDEA...IT'S



20TH CENTURY

DESIGN THAT TOOK YEARS OF

RESEARCH



AND TESTING

TO DEVELOP!



IT'S PHILLIPS

THE ENGINEERED RECESS

...and speed of driving, there
nothing quite like the Phillips
Recessed Head Screw.

That's because the Phillips Recess
developed from scratch—not just
adapted from some older, less satis-
fying type of recess. It's an engi-
neered recess... with years of costly
designing and research behind each
design feature.

As a result, every angle, every flat
surface, every dimension of the
Phillips Recess makes a definite con-
tribution to easier, faster, more
efficient screw driving.

The recess walls are angled just
right to eliminate fumbling starts, to
let workers utilize their full turning
power. The 16 flat planes are pro-
vided to hold even worn drivers
snugly. And the depth of the recess
is exactly figured to give unusual
strength to Phillips Screw Heads,
and make it easy to keep Phillips
Bits and Drivers lined up with the
axis of the screw.

**To Make Wartime Quotas
and Peacetime Profits . . .**
get the faster starting - faster driv-
ing—stronger, better-looking fasten-

ings that only screws with Phillips
Recessed Heads can give you! All
over the country, manufacturers are
switching to Phillips Recessed Head
Screws to speed up assembly and cut
costs. Give your assembly depart-
ment "a shot in the arm" - change to
Phillips Screws, too. Available in all
head styles, types, and sizes!



PHILLIPS *Recessed Head* **SCREWS**

WOOD SCREWS • MACHINE SCREWS • SELF TAPPING SCREWS • STOVE BOLTS

4 SOURCES

American Screw Co., Providence, R. I.
Atlantic Screw Works, Hartford, Conn.
The Bristol Co., Watertbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
General Screw Mfg. Co., Chicago, Ill.

The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
Manufacturers Screw Products, Chicago, Ill.
Milford Rivet and Machine Co., Milford, Conn.
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
Parbur-Rulon Corp., New York, N. Y.

Pawtucket Screw Co., Pawtucket, R. I.
Pheol Manufacturing Co., Chicago, Ill.
Reading Screw Co., Harrisburg, Pa.
Russell Barisall & Ward Bolt & Nut Co., Port Chester, N. Y.
Sovell Manufacturing Co., Waterville, Conn.
Shakeproof Inc., Chicago, Ill.
The Southampton Hardware Mfg. Co., Southampton, Conn.
Wolverine Bolt Co., Detroit, Mich.



IDENTIFY IT!

Center corners of
Phillips Recess are
rounded . . .
NOT square.

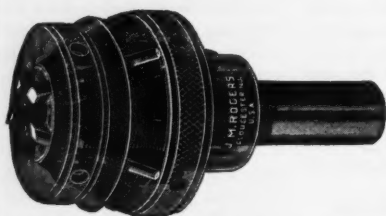
Bottom of Phillips
Recess is nearly
flat . . .
NOT tapered to
a sharp point.

ROGERS PATENT ADJUSTABLE HOLLOW MILLING TOOL

now helping win its third war
and still going strong.



Carbide Tips Optional.



Easily Adjusted. Rigidly Locked.
Rogers Built Since 1890.

**THE JOHN M. ROGERS
TOOL CORP.**
Gloucester City New Jersey

crystalline surface evidently is responsible for the theory, long prevalent among practical men, attributing such failures to a "crystallization" of the metal under load.

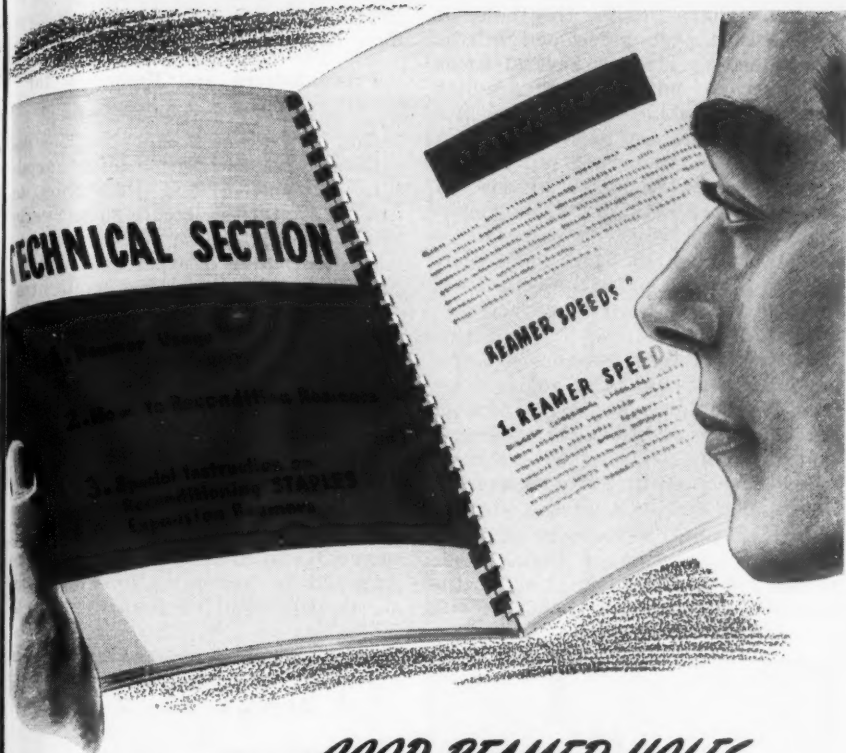
Metallurgists proved years ago that no such "crystallizing" or crystalline change is possible at ordinary operating temperatures. In other words, the crystalline structure of this axle when it failed was practically identical to that set up by the final step in its heat treating process. The actual process of failure probably was surprisingly simple; breakage started at some minute point of weakness on the surface at section (a), then a crack started to form and gradually spread until the axle was weakened to the stage where the shocks of a grabbing clutch twisted it off. The early part of the fracture (a) had sufficient time to become rusted before the final breakdown.

Fatigue or progressive failures usually have their origin at an inherently weak spot in tension. At such a point a high, repeated tensile stress may start a tear and then gradually but very slowly extend this tear until total failure occurs. Ductile materials seem to yield somewhat, thereby relieving such localized excessive stresses; consequently they have better endurance characteristics than brittle materials. Metals which respond to work-hardening undergo strength increase as yielding occurs and may, under some conditions, gain sufficient strength to avoid failure altogether.

Causes of Fatigue Failure

The real source of the failure in the axle described above probably was the high stress concentration set up in a minute forging fold or seam or in one of the numerous surface irregularities caused by scale particles being pressed into the axle surface during forging.

It has been determined by research



HOW TO GET *GOOD REAMED HOLES* THIS FREE BOOK TELLS HOW

This valuable book will help you eliminate reaming trouble, increase cutting production and reduce tool costs. It answers such important questions as—

What are the best reamer speeds? What conditions contribute to chatter and out-of-round holes—and how can they be corrected? What are the best reamer feeds? What is the recommended practice on tool body diameters—on land widths—on reamers piloted through bushings?

It gives you valuable suggestions on sharpening and reconditioning carboly-tipped reamers. Fully illustrated with photographs and diagrams that are easily understood.

This Technical Manual is included in the complete catalog on Staples Carboly-Tipped Circular Cutting Tools. Your machine operators will find the data in this book of real practical help. Send for your copy today.

Staples Tool & Engineering Company
Cincinnati 25, Dept. MT . . Ohio

Staples

CARBOLY-TIPPED CIRCULAR CUTTING TOOLS

REAMERS • CORE DRILLS • SPOT FACERS • COUNTERBORES • END MILLS •
SHELL END MILLS • ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS

that any sharp groove, tiny hole, or scratch in a part under load will be surrounded by stresses several times the average pounds-per-square-inch stress which would exist if such imperfection were not present. Design handbooks list separate factors applicable to various conditions of stress concentration. This means that no part which is expected to withstand repeated loads indefinitely without fatigue failure can be allowed to have or develop any of such irregularities as:

Scratches and roughness, tool marks, seams, cracks or folds, sharp fillets, sharp grooves, sharp number stamps, tiny drilled holes, segregations of impurities, blow holes, shrinkage cavities, hardening strains, quenching cracks, corrosion pitting, etc.

Any of these imperfections, if located at a section of high tensile stress, will increase that stress to the extent of starting a tear which will

grow gradually but steadily to produce complete failure.

Preventatives and Remedies for Fatigue Failures

The prevention of such failures demands, first of all, careful metallurgical control and inspection to avoid all internal defects such as segregations, blowholes, shrinkage cavities, hardening strains and cracks. Many strains and stress concentrations may be relieved by proper heat treatment, which offers the additional advantage of increasing ultimate tensile strength and yield point.

Hand in hand with the metallurgist's responsibilities go the designer's obligations to design so as to avoid fatigue or endurance casualties. High stress concentrations must be avoided by eliminating in the design any sharp fillets, small holes, thin sections adjacent to heavy sections, and unnecessarily complex shapes.

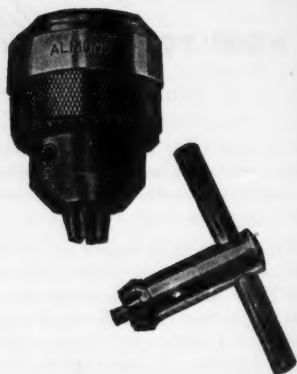


● The Almond Three Jaw Drill Chucks were the first to be placed on the market. They were Pioneers in the field of Drill Chucks!

ALMOND THREE JAW DRILL CHUCKS are furnished in 9 sizes with capacities from 3/16" to 1". These are made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole. For Portable Drills.

Write for Complete Details.

• • SINCE 1872 • •



T. R. ALMOND MFG. CO.
ASHBURNHAM MASSACHUSETTS

"ROCKWELL" HARDNESS TESTER



Lindberg Steel Treating Co. sent in this photo of inspection testing.

Those who test their product are not afraid of the truth but they properly are afraid to risk their good will by sending untested parts out into the world carrying their name or trade mark.



AN ASSOCIATE COMPANY OF
AMERICAN CHAIN & CABLE COMPANY, INC.

January, 1945

WILSON

MECHANICAL INSTRUMENT CO., INC.

369 Concord Ave., N. Y. 54, N. Y.

MODERN MACHINE SHOP 149

Neither the designers' nor the metallurgists' precautions will avail to any worthwhile extent if the production engineers and operators do not maintain comparable vigilance. Scratches, surface marks from tools or handling, and general carelessness in meeting process and inspection specifications may lead to failure of a forging for a bomber, for instance, as surely as will a hidden seam.

Many of the defects discussed may be revealed by the Magnaflux, radium, X-ray, fluorescent detection and other methods. However, since the majority of such cases may be either unsalvageable or at least costly to salvage, a thorough understanding of the factors involved by all parties concerned is essential.

Surfaces of parts required to have long endurance life may be treated in a variety of ways to eliminate irregularities and increase the natural resistance of the skin section to progressive fracture. Burnishing, rolling and shot blasting act similarly to precompress the skin and thereby serve to counteract high, localized tensile stresses which might start fatigue failure. Shot blasting or peening which lends itself equally well to simple and complicated shapes is found in some cases to increase endurance life as much as nine or ten times that of the untreated part.

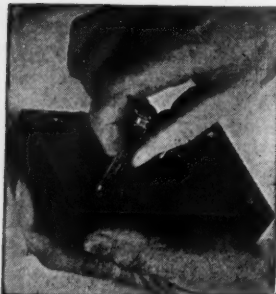
Shot blasting may be applied to the gas-forged surfaces without pre-

liminary machining. The peening action deforms the surface and hammers it out so that the skin tends to carry residual compressive stresses. Thus, if the residual stress so produced were 5,000 psi in compression in the skin, a tensile stress induced in operation would have to exceed 5,000 psi before any net tensile stress would act to start a fatigue failure.

The fatigue phenomenon has been likened to a disease because of the way in which it strikes at a point of weakness and spreads to bring about the final destruction of its victim. Like a disease, it is costly but, fortunately, like many diseases it may be prevented or avoided. The prevention of fatigue or progressive failures in machine parts in most cases is neither mysterious nor difficult. It does, however, require thorough understanding and careful vigilance on the part of all those involved in the design, production, inspection and handling of the parts concerned.

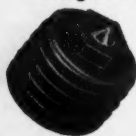
"Quick Analysis of Tapping Troubles" is the title of a shop reference list designated as the No. 15 which is now being offered by Henry P. Boggis & Co., 1279 W. Third St., Cleveland 14, Ohio. The list groups together related tapping troubles, and causes and suggested remedies for same.

Suggestions on the proper care of taps are also included in the folder, copy of which is available to individuals addressing requests on their company letterheads.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{8}$ " to 1" diameters. Send for price list.

HEIMANN MFG. CO.

330 Lincoln Ave.

Urbana, Ohio

peening
and ham-
tends to
stresses
so pro-
compression
induced
to exceed
while stress
failure
has been
e of the
point of
ng about
s victim
but, for-
s it may
The pre-
sive fail-
ost cases
icult. It
thorough
vigilance
olved in
tion and
ed.

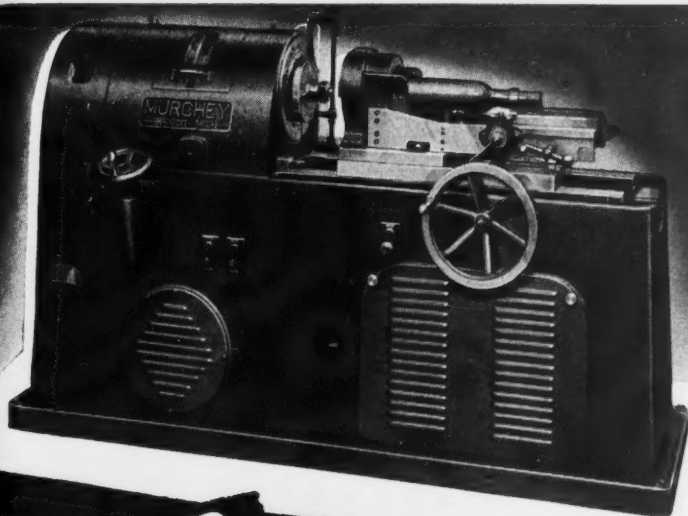
"troubles"
list des-
is now
Boggis &
land 12
r related
and sug-
e of tape
copy of
uals ad-
any let-

ND
inery
ght-
trans-

is a
No
Made
re list.

Ohio

ary, 1945



**FOR
FASTER,
MORE ACCURATE
THREADING**

that will keep
YOU AHEAD
of schedules—

Install a
MURCHEY

No. 32 THREAD MILLING MACHINE

Built and geared for mass production of right or left hand internal or external threads 1" in diameter up to 4" O.D. inclusive and up to 6" I.D. depending on the contour of the piece. 3" long up to 1/2" pitch and covering full length of thread through annular milling cutters. Completely hydraulic work cycle and a variable speed drive permits the selection

of the right speed and feed for each job. Write for complete catalogue to Dept. M-3

MURCHEY MACHINE & TOOL CO.
DETROIT 26, MICHIGAN

Murchey also manufactures all types of Collapsible Taps, Self Opening Die Heads and Shell Tapping Machines. Write for literature on any or all of these products.

MURCHEY

MODERN MACHINE SHOP 155

January, 1945

Recent Progress In High Speed Tapping, III.

Tapping efficiency affected by weight of fixture—Air-operated fixtures—Fixtures for High Speed Tapping—Circular Dial Feed Fixtures—Tapping Plastics—Grinding Taps

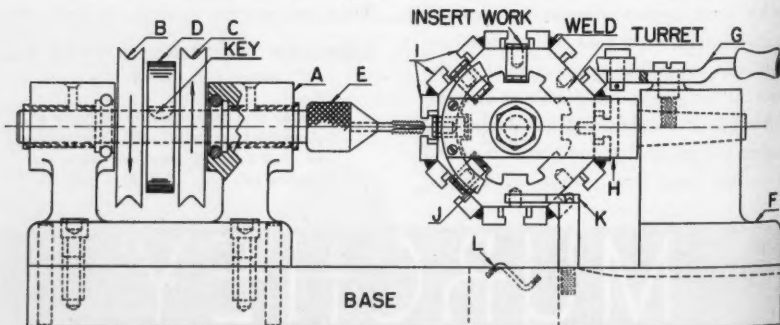
By C. W. HINMAN
Designing Engineer

SUCCESSFUL tapping often depends upon the design of the work-holding fixture, and is affected to a considerable extent by the weight of the material from which the fixture is made. Eight general conditions were given for the design of tapping fixtures in the preceding article (Nov., 1944), and in addition it must also be said that large fixtures for tapping a number of holes in heavy work of odd shapes should be

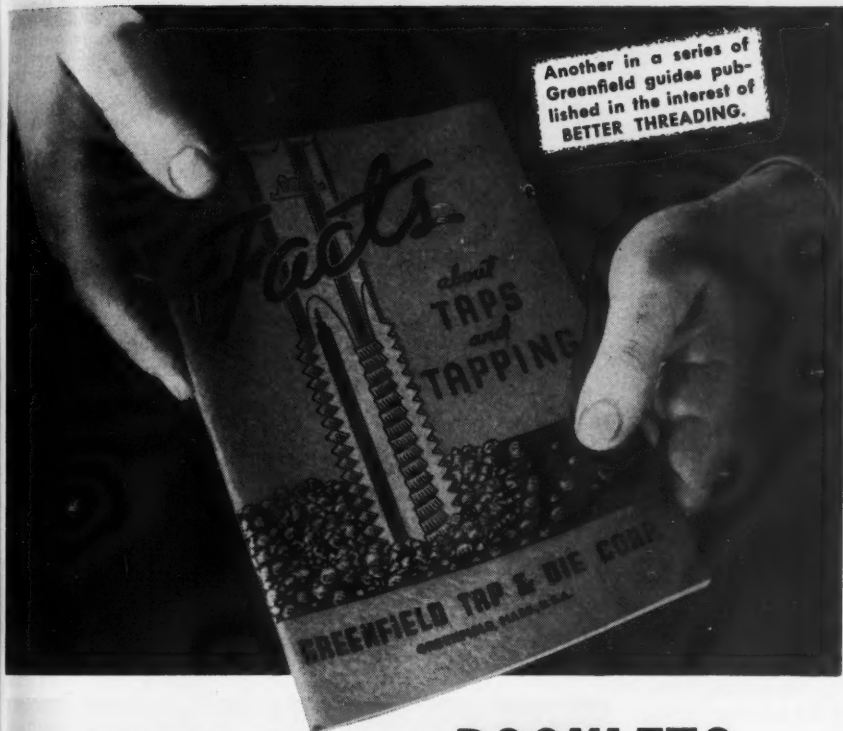
made from aluminum alloys such as Duralumin, which is a light-weight material.

This item is especially important if the fixture must be changed in position on the tapping machine tables. Obviously it is much easier to turn a light-weight fixture from side to side for tapping opposite holes if the fixture is light in weight. The fixture can be made either of Duralumin stock or of cast or forged Duralumin.

Fig. 12—Drawing presenting design of a simple high speed tapping machine and special fixture designed for tapping one hole in a light part at a rate of 3500 pieces per hour.



Another in a series of
Greenfield guides pub-
lished in the interest of
BETTER THREADING.



MAY WE SEND YOU THIS **BOOKLET?**

"Facts About Taps and Tapping" has been called "the finest booklet of its kind ever published." It contains authoritative, indispensable facts about thread cutting and threading tools. Perhaps it contains ideas that will prove helpful and profitable in your shop. For your copy call your "Greenfield" distributor or mail the attached coupon.



FTD
GVD GREENFIELD
GTD

GREENFIELD TAP and DIE CORPORATION
GREENFIELD • MASSACHUSETTS

Mail coupon for free booklet today!

Greenfield Tap and Die Corporation
10 Sanderson Street
Greenfield, Massachusetts

Please send me, free of charge, a copy of
"Facts About Taps and Tapping."

NAME _____

FIRM NAME _____

STREET, CITY _____

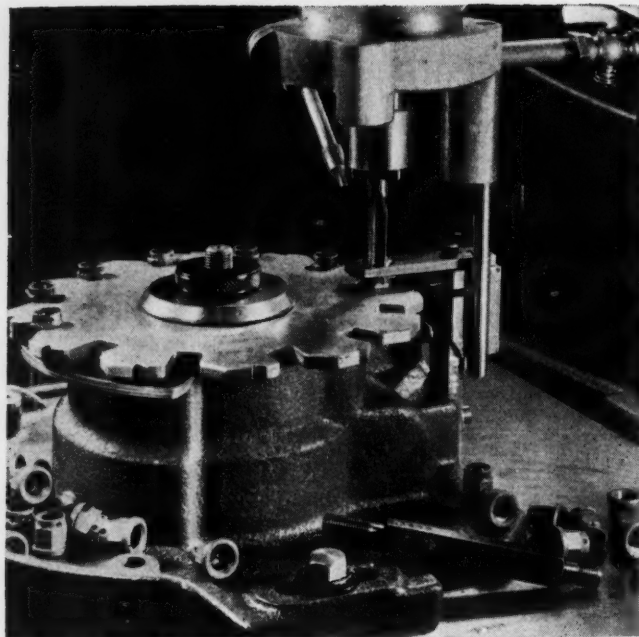


Fig. 13 — Automatic dial feeding fixture designed to hold steel aircraft nuts for tapping $\frac{1}{2}$ inch deep at a rate of 400 per hour.

Compressed Air Fixtures

The application of compressed air to tapping fixtures for holding and releasing the work is a comparatively recent innovation. On one of the more common applications of air for this purpose, the work is held by centralizing it with outside clamps that

then machine-finished. The operating cycles of the piston are con-

are operated by a vertical air cylinder which is an integral part of the body of the fixture, and which is placed directly under the work. In this case, if the fixture-body is small, it is usually cast from semi-steel or cast iron and all the working surfaces are

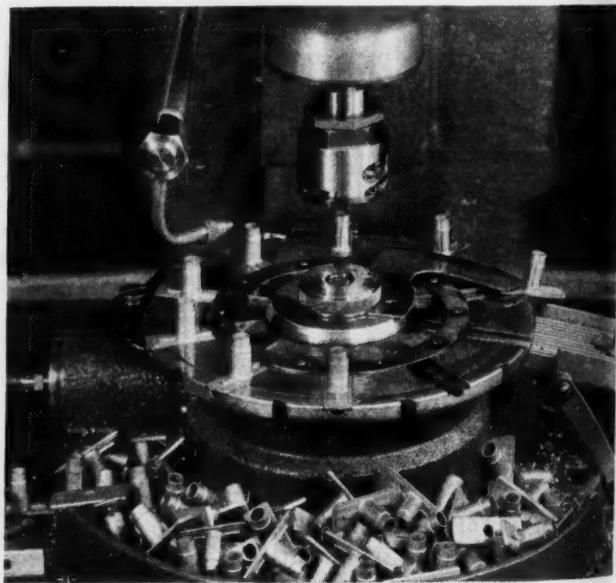


Fig. 14—With the aid of this air-controlled automatic dial-feeding fixture, an external thread $\frac{1}{2}$ inch long is cut in $1\frac{1}{4}$ seconds, or at a rate of 2,000 pieces per hour.

omatic
fixture
d steel
or tap-
sweep at
r hour.

l by a
cylind-
is an
rt of
f the
which
rectly
work.
if the
dy is
usual-
semi-
t iron
work-
s are
oper-
e con-

ary, 1945

WHEELS

within

WHEELS



Foremen and superintendents constantly are being amazed at what can be done with RFC wheels and discs. Heart-breaking jobs become pushovers. Hours are saved daily ... patience, too; while accuracy is held to highest standards.

RFC HAND-CUT ROTARY FILES include a full line of wheels and discs ... popular among power tool users the country over. Some are made one-piece, others stem-fitted, and still others drilled or tapped to fit your spindle.

The right steel, properly heat-treated ... expert cutting to correct design and size ... all are important. Remember, RFC specialists' 20 years of experience go into the manufacture of every RFC rotary file.

Investigate the new skills that RFC hand-cut rotary files have brought to thousands of plants. Catalog upon request.

The **ROTARY**
FILE COMPANY
STRATFORD, CONN.

January, 1945

MODERN MACHINE SHOP 159



Fig. 15 — This 10-station dial-feeding fixture makes it possible to tap a plastic knob in less than $1\frac{1}{4}$ seconds, or at a speed of 3,000 per hour. A flat spring projects thru one of the holes in the dial, at the right, and ejects the finished work when it reaches that station.

trolled through a four-way valve connected with a solenoid helix which is activated by a limit switch in unison with the vertical movements of the tapping machine spindle.

For tapping small pieces, and for very light operations, it is possible to secure the spindle and chuck in a fixed position and then arrange to raise and lower the fixture and work for tapping "in" and "out." The advantage of this method is that more accuracy is gained through avoiding loose play in the spindle and chuck. Small parts for precision mechanisms such as those used in instrument panels and the delicate parts of bomb-sights, time pieces, and business machines, in which screws of very small diameters and having 80 threads per inch and upward are used, are tapped more successfully by this arrangement.

The fixture can be designed with a

table or fixture up and down for tapping "in" and "out."

High Speed Tapping Machine and Fixture

On the drawing Fig. 12, headstock **A** is positively anchored on a base and is provided with a horizontal shaft that runs in bronze bushings. The shaft carries two sheave pulleys **B** and **C**, grooved for round belts, and both pulleys can be revolved freely in their respective positions. These pulleys are driven from overhead by open and crossed belts, pulley **B** revolving to the right and **C** to the left, **C** running at twice the speed of **B** for backing out the tap. Between the pulleys is the friction disc **D**, which is keyed onto the shaft. Chuck **E**, mounted on the right-hand end of the shaft, holds the tap.

Tailstock **F**, at the right, slides in a guide provided in the base, and can

vertical air cylinder located under it to raise and lower the work automatically, controlled through a limit switch and solenoid, or a toggle lever with a small counterweight can be employed to reciprocate the machine-

The
**FIRST
STEP**
in

Reconversion

Look

At Your Bearings

It makes little difference whether your machinery and equipment has been on war duty or inactive service. Before you convert to civilian production check up on the bearings. Breakdowns because of bearing failure can be prevented. When replacement is necessary—specify Johnson UNIVERSAL Bronze. It's the best on the market.

JOHNSON BRONZE COMPANY

590 South Mill Street

• New Castle, Penna.



Write for Catalogue

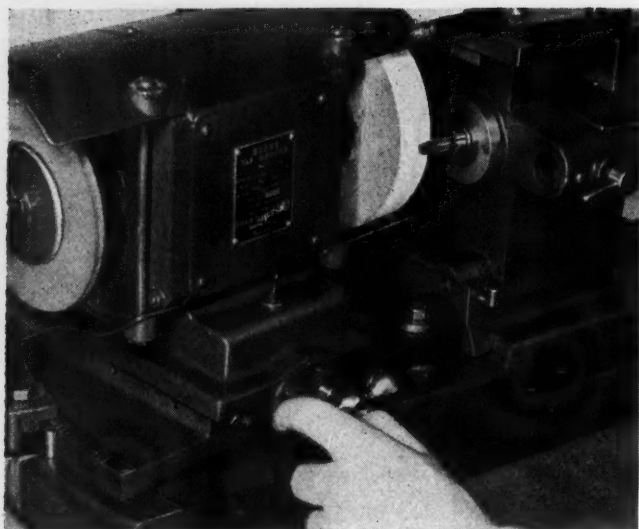


Fig. 16 — Tap-grinding machine with tilting work - holding unit. Taps with any number of flutes from two to ten can be ground in this machine.

be reciprocated to and from the tap chuck by moving the handle on toggle-lever **G**. Member **H** carries a turret which has eight equally-spaced work stations, and which can be revolved on its center bolt. An integral part of member **H** is a tapered shank by which it is located in a reamed tapered hole in the part **E**. The centerlines of the tapered shank, turret bolt, and the tap in the headstock form one straight line.

Stripper hooks **I** are properly spaced to clear the work on both sides, and alignment of the work is further assured by the use of notches cut in a circular plate attached to the front side of the turret, into which the workpieces enter. The workpiece is a product of the punch press, punched from steel sheet and formed so that it has two opposite right angle bends, one at each end. A hole is pierced in the center of each of the right angle bends, and these are the holes that are to be tapped in the machine under discussion.

To operate, the operator inserts the work into the station of the turret,

using his left hand, and after loading three stations advances the turret, by the handle, with his right hand. When the hole in the workpiece contacts the tap, friction disc **D** is depressed into contact with pulley

B, which revolves the chuck and taps the hole. The operator then reverses the travel of the turret, and as the friction disc is moved into contact with pulley **C** the direction of the tap is reversed and the tap backs out at double speed. A pawl and ratchet arrangement behind the turret causes the turret to revolve as it reverses movement, thus bringing the next loaded station into position for tapping and locking it there.

As each workpiece in turn revolves with the movement of the turret, it passes under retainer strip **J**, which holds the workpiece in alignment with the tap. The finished work is ejected at the bottom station in the turret where the chisel-pointed ejector blade **K** raises the work and turns it out of its "nest." The work falls out through an opening in the base of the machine as shown at **L**.

The movement of the turret is only about $1\frac{1}{2}$ inch, and the operator can load 60 pieces per minute. It is possible here to substitute a compressed air cylinder in place of toggle lever **G** to advance and withdraw the turret

o-grind
with tilt-
holding
with any
es from
can be
this
.

left
fter
ee sta-
ces the
y the
th his
When
in the
con-
p, fric-
is de-
o con-
pulley
nd taps
everses
as the
contact
of the
cks out
ratchet
causes
everses
e next
or tap-

evolves
rret, it
which
nt with
ejected
turret
ejector
urns it
k falls
ne base

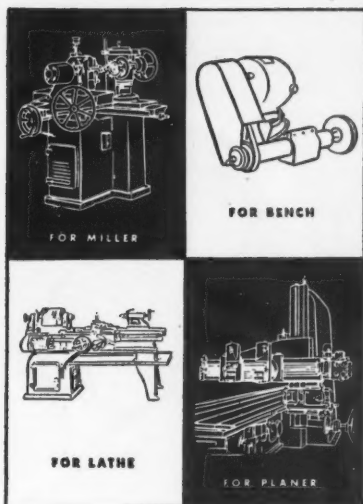
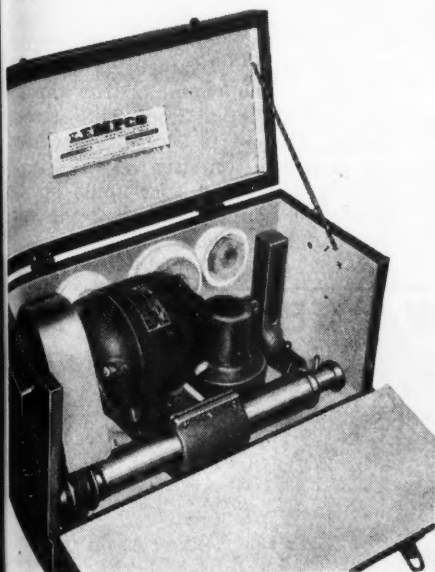
is only
tor can
is pos-
pressed
le lever
e turret

January, 1945

VERSATILE

IS THE WORD FOR THIS . . .

- ★ Preloaded Matched Sets of Bearings
- ★ Rigid 1-Piece Frame
- ★ 6,000 to 13,000 R.P.M. Spindle Speeds



PORTABLE PRECISION TOOL POST GRINDER

It is likely to become the busiest machine in your plant, for it is equally efficient on lathe, shaper, planer or miller. Exclusive Lempco base construction enables one quill to do the work of two different length quills. Precision grinds internal, external, face and taper jobs. Handy, fitted, portable wood chest available. Good delivery! Ceiling-priced!

WRITE FOR CATALOG

LEMPCO

5717 DUNHAM ROAD • BEDFORD, OHIO

MODERN MACHINE SHOP 163

and work where the expense is justified by a large output; this setup then becomes entirely automatic ex-

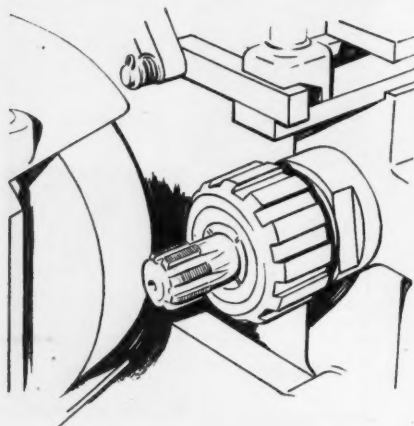


Fig. 17—When taps cannot be held by the center holes for grinding, they can be held in special collets, as shown here.

cept for the loading, and the output is correspondingly increased. This machine is adaptable for tapping various shapes of small parts by using a turret that suits the part, or by mounting different types of holding fixtures in the tailstock.

Circular Dial Feed Tapping Fixtures

The illustration Fig. 13 shows an interesting set-up for tapping nuts of the type that is used in large quantities for assembling aircraft com-

ponents. The work material is SAE 3140 steel which has been heat treated to Rockwell 26-32.

The fixture consists principally of a cast iron base to which is attached a circular dial having 12 equally spaced notches cut in the periphery in which the nuts are carried to the tap. The dial is revolved and indexed from station to station by means of an automatically-controlled air cylinder located within the base of the fixture.

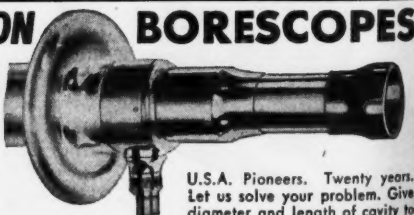
At the right of the tap in the illustration can be seen a vertical rod which is attached to the tapping chuck, and which automatically operates a combination stripper and hold-down clamp. A strip of metal guides the nuts and prevents them from moving out of the slots, when the dial is in motion, and also positions each nut directly under the point of the taps as it arrives at the point of tapping. Two ends of the guide strip are visible in the photograph.

The tap is $\frac{3}{8}$ -inch, 24 thread, of the three-fluted gun type with No. 1 tolerance. The class of thread fit is No. 3, and the hole must be tapped to 15/32-inch deep and to 90 degrees with its collar within 0.003 inch parallelism. The r.p.m. of the tap are 365 and 730 "in" and "out" respectively. Output is 900 nuts per hour; air pressure on the spindle is 28 pounds down and 15 pounds up, the latter for counterbalancing the spindle, tap and chuck.

ILLUMINATED INSPECTION



LENOX Instruments explore the dark holes of industry—guns, turbine rotors, hollow shafts, tubes, tanks, well drill pipe, cartridge cases, etc.



U.S.A. Pioneers. Twenty years. Let us solve your problem. Give diameter and length of cavity to be inspected.

LENOX INSTRUMENT COMPANY

**2010 CHANCELLOR ST.
PHILADELPHIA 3, PA.**

s SAE
treat-

ally of
attached
equally
inery in
the tap.
d from
of an
cylinder
fixture.
e illu-
al rod
apping
y oper-
d hold-
guides
from
en the
ositions
point of
e point
e guide
aph.
ead, of
No. 1
ead fit
tapped
degrees
ch par-
ap are
respec-
hour;
is 28
up, the
e spin-

ES

years.
Give
ity to
ST.
P.A.

ary, 1945



Save these for work a machine can't do



HC-5— $\frac{1}{2}$ H. P., multi-speed countershaft unit, 900 to 3600 R. P. M. Mounted bench-height on 3-leg caster base, 360° swivel.

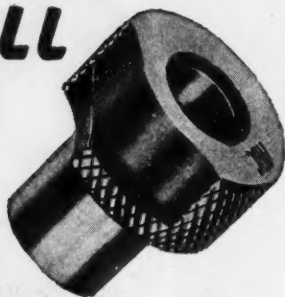


There was a time, not so many years ago, when the words "Made by Hand" were synonymous with highest quality. In some things this still holds true.

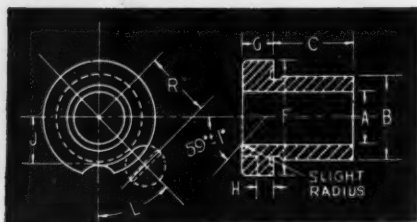
But it is equally true that many operations can be done better and faster, with a greater degree of efficiency, when a Haskins Flexible Shaft Machine is used. And this with much less strain and fatigue on the part of the operator.

Grinding—Sanding—Rotary filing—Wire brushing—Buffing and Polishing—all are machine operations. There are many more. Write for Catalog 45, showing many ways to save your hands and speed production with flexible shaft equipment.

A. S. A. STANDARD PRECISION DRILL JIG



BUSHINGS From STOCK



5 STYLES

- Headless Press Fit Bushings
- Head Press Fit Bushings
- Fixed Renewable Bushings
- Slip Renewable Bushings
- Headless Liners

Also a complete line of accessories.

SEND FOR CATALOG



ACCURATE  **BUSHING**
COMPANY

403 NORTH AVE. • GARWOOD, N. J.

166 MODERN MACHINE SHOP

An External Threading Operation

Figure 14 shows an air-operated 10-station dial-feeding fixture developed by Haskins in Chicago for the external threading of workpieces which must be threaded to within 0.055 inch of the rib. The $\frac{3}{8}$ -inch 24 pitch thread is cut with a threading die having removable high speed steel

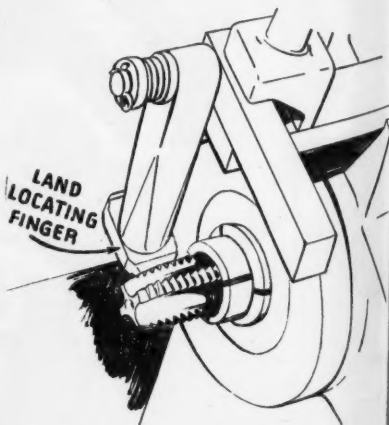


Fig. 18—For grinding chamfered points, taps can be held in bushings as shown here.

chasers. The work material is a zinc base die casting, and the finished work must fit a No. 2 Class thread gage $\frac{1}{2}$ inch deep.

Since all these parts must subsequently be plated, it is not desirable to use the regular or usual types of cutting oils for lubrication. However, to ensure a smooth cut and to prolong die life, the parts are sprayed with a light coat of thin oil mixed with carbon tetrachloride. This light lubricant evaporates rapidly, and the finished work requires but a slight washing before plating.

A stream of air directed through a nozzle onto the dial keeps it cleared of chips. The operator has no difficulty in maintaining an output of 2,000 pieces per hour, since the parts

ation
ted 10-
veloped
exter-
which
55 inch
pitch
ng die
steel



nts, tap
here.

a zinc
inished
thread

subse-
sirable
pes of
How-
and to
prayed
mixed
s light
nd the
slight

ough a
leared
o diffi-
out of
e parts

ry, 1945

HARDINGE
ELMIRA, N.Y.



SPECIFICATIONS:

Collet capacity, 9" swing, 16" over distance, sixteen spindle speeds from 27 to 1780 r.p.m.

HARDINGE

High Speed Precision TOOL ROOM LATHE

When tool room collet work with one inch diameter or less is done on heavy lathes designed to produce large work, here is what happens—time is lost, machines lose money by under-capacity production, excess power for the work involved and floor space is wasted.

For profits proportionate to machine invest-

ment, use the proper size tool room lathe comparable to the work involved.

To have complete information on a precision machine designed for speedy turning, boring and threading, obtain a copy of our bulletin illustrating and describing the above unit.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

are easy to feed and the finished work is automatically ejected into the delivery chute which can be seen at the right. The die r.p.m. are 1,000 for threading and 2,000 r.p.m. after the die reverses. Air pressure on the spindle is 20 pounds.

Tapping Plastics

The automatic dial feeding fixture shown in Fig. 15 is designed to tap a $\frac{1}{4}$ -inch, 20-thread hole, $\frac{1}{4}$ inch deep in a plastic hand knob. The tap r.p.m. for tapping in is 1,700, and for backing out the tap is 3,400. Production is 3,000 pieces per hour.

The stripper plate, which also clamps the work over the tapping station, is raised and lowered by the movements of the vertical rod attached to the chuck at the rear of the tap. The stripper plate not only clamps the work parallel on the dial, before tapping, but it also prevents the work from revolving with the tap by means of two tapered pins in the plate that enter between the ribs in the work.

Grinding Taps in Machines

Figure 16 is a front view of a tap-grinding machine. This equipment consists of a rectangular base upon which is mounted, at the left, a graduated swivel plate carrying a motor head which supplies the power for grinding, and at the right, a work-holding unit. A flute polishing wheel

is mounted on the left end of the motor shaft.

Examination of the illustration will disclose that the work-holding unit is mounted on a shaft upon which it

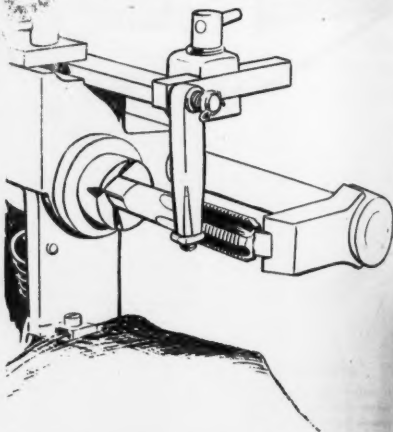
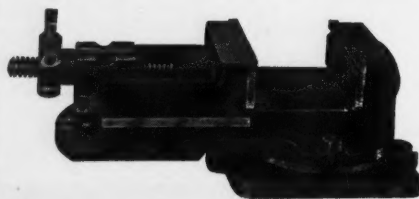


Fig. 19—Maximum accuracy in tap-grinding is obtained by grinding the tap between centers, as illustrated here.

can be tilted as required, and is connected by an adjustable eccentric mechanism with the crankshaft spindle. The desired relief, when grinding the chamfer on the taps, is obtained by means of a simple screw adjustment in connection with the eccentric mechanism.

The crankshaft spindle is connected with the work spindle through a train of gears. To grind taps having any

GEM DRILL PRESS AND MACHINE VISES...



Modern Vises for Tool-room and Production. Sizes ranging from 3" to 10 $\frac{1}{4}$ " opening. Strong, Versatile, Quick-Acting. Pay for themselves in time-saving.

Write for circular describing entire line of GEM MACHINE VISES.

J. E. MARTIN MACHINE WORKS

548 State St.

Springfield, Ohio

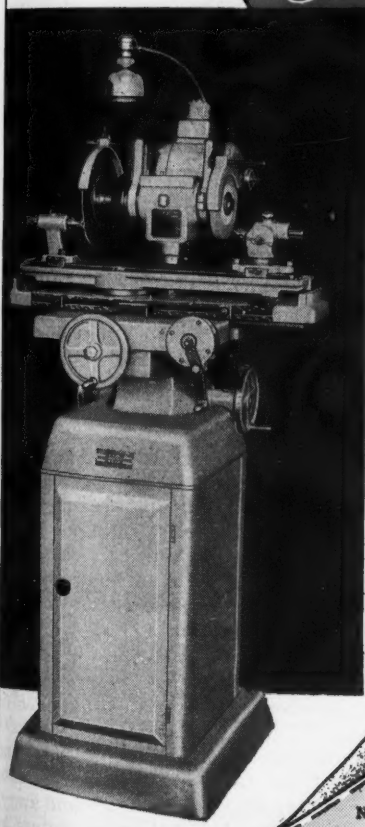
f the
n will
unit
ich it

ing is
enters,
con-
tric
spin-
rind-
ob-
crew
e ec-
ected
train
any

uc-
1/4"
ng.
ine
KS
hio

1945

Model B660
Knock-Out
UNIVERSAL TOOL GRINDER
NINE OPERATING SPEEDS
1,100 to 11,000 R.P.M.



*You'll
Want This New
Tool Grinding Book!*

Illustrative literature just off the press is now available for the asking. Fifty-two operating pictures, latest improvements in tool grinders. Many time saving grinding fixtures that are adaptable to any make tool grinder.

Detach, fill out and send in coupon today.

K. O. LEE CO.,
Aberdeen, S. D.

Gentlemen:

Please send me by return mail, and without obligation, your new booklet No. 35-15.

Name

St.

City State

Name of Company

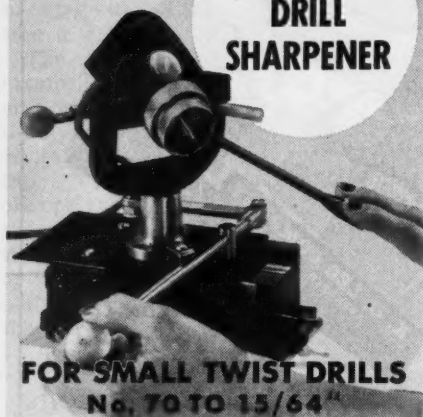
NOT MINUTES



JUST 20 SECONDS!

IT'S NEW! IT'S FAST!
IT'S ACCURATE!

TOMBILL DRILL SHARPENER



FOR SMALL TWIST DRILLS
No. 70 TO 15/64"

TOMBILL DRILL SHARPENER

grinds small drills from No. 70 to 15/64" speedily and economically. Magnified visual alignment eliminates guesswork in indexing. An inexperienced operator can grind uniform, perfect drills after a few minutes instruction.

Each size drill requires a different bushing and 10 bushings of your size choice are supplied with each sharpener. Write for folder.

\$134⁵⁰

With 10 Bushings

MERCURY PRODUCTS CO.

423 EUCLID AVENUE
CLEVELAND 14, OHIO

number of flutes from two to ten it is only necessary to change one or two gears to suit the number of flutes to be ground.

A tap can be inserted or removed from the machine in a few seconds, and a simple registering device ensures correct positioning and high precision duplication when grinding taps. A good tap-grinding machine makes it possible to save taps that formerly were discarded when dull or those in which the centering holes are broken or ground away, and to get much better work from machine-ground taps than from those that have been hand-ground. It will save much time, critical tools and materials, and, accordingly, a considerable amount of cash.

In order to grind the chamfer of taps having round shanks larger than 1/2-inch diameter, when it is not desirable or possible to use driving squares or center holes, special collets are used to hold them by their shanks as shown in Fig. 17.

Figure 18 shows the approved method for holding taps on their threading lands for grinding chamfered points. The bushing around the tap is held in a master collet and can quickly be removed for changing from one size to another. Individual collets for each size of tap can be used, but it takes more time to exchange collets for other sizes. Right or left hand taps are sharpened without making any changes in the machine; the machine can be set for grinding either right or left hand taps by simply turning a locating finger at the end of the arm.

The maximum accuracy in grinding taps can be attained by holding the tap between centers, as illustrated in Fig. 19, but there are cases where this cannot be done because the front end of the tap is broken, or because the center hole has been ground away. To hold the tap between centers is

THE RIGHT WHEEL FOR THE RIGHT JOB!



• For every abrasive engineering problem, there's a specific solution. It may be in the newest Mid-West grinding wheel—a wheel that cuts cool and stands up to the toughest grinding job long after the ordinary wheel's usefulness is over.

But whatever the abrasive need, there's a Mid-West item to meet it. Mid-West sandpapers, honing stones, rubbing bricks, sharpening stones, compounds or wheel dressers—all are products of unassailable quality.

You'll find a specific solution to your abrasive problem in the Mid-West line.

MID-WEST ABRASIVE CO.

Manufacturers of DEFENDABLE ABRASIVES

Owosso, Mich.

1960 E. Milwaukee, Detroit 11, Mich.

Rochester, N.Y.

BUYERS—Send for the Mid-West Abrasive Company's grinding wheel catalogue—a complete data book giving you detailed recommendations on your grinding problem. Mid-West Abrasive Company, 1960 E. Milwaukee Avenue, Detroit 11, Michigan.

NAME _____

ADDRESS _____

the logical method to use for grinding the points, but if the centers are gone the tap can still be ground by holding it in a bushing and collet as in Fig. 18. Grinding taps with the equipment shown here is routine work, even in the hands of inexperienced help, as anyone can easily be trained to do a good job.

Someone has proposed that a machine should be designed for grinding spiral-pointed taps as of the chip-driver type, and no doubt such a machine will soon be available for that purpose.

Reiff and Nestor Taps and Reamers. An 84-page Ring-O bound catalog on taps and reamers has been prepared by the Reiff & Nestor Co., Lykens, Pa. Designated as the No. 7, the catalog includes illustrated, descriptive, and tabular information concerning standard hand taps, spiral pointed hand taps, stove bolt taps, standard machine screw

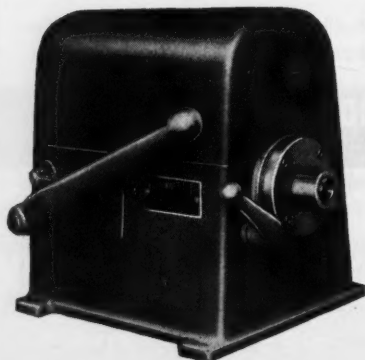
taps, spiral pointed machine screw taps, serial hand taps, nut taps, straight and bent shank taper taps, pulley taps, straight and taper boiler taps, mud or washout taps, staybolt taps, spindle staybolt taps, pipe taps and pipe reamers, taper pipe taps, expansion hand reamers, standard hand reamers, jobbers' reamers, adjustable reamers, fluted and rose chucking reamers, taper pin reamers, Morse taper reamers, bridge and boiler reamers, fluted shell reamers, shell reamer arbors, and so on.

The catalog also includes information on ordering standard and special taps, screw thread terms and definitions, as well as tables on gage limits, cutting speeds, basic thread dimensions and tap drill sizes, three-wire system of measurement, decimal equivalents, and so on.

Bristol Model 93 Air-Operated Controller. An eight-page bulletin published by The Bristol Co., Waterbury 91, Conn., describes an air-operated controller, designated as the Model 93, for the control of temperature, pressure, vacuum, liquid level, humidity, and flow. Copy of Bulletin No. A115 free upon request.

The COLBORNE Speed Lathes

**SPEED UP FINAL OPERATIONS ON
DIES • GEARS • SCREWS • LONG RODS**



A recent addition to the COLBORNE line of Speed Lathes is the Series 30 machine. This speed lathe is indispensable for economical polishing, grinding, burring and lapping.

Very compactly constructed to do highest quality work with the COLBORNE features of spindle bearings running in oil, instant stopping brake, easy opening collet and standard speeds of 600-920-1720-3280-4800 RPM using ¾ H.P. motor and cone pulleys. Collets and chuck may be used.

For more production per day choose COLBORNE.

PROMPT DELIVERIES

Write for Details Today.



**COLBORNE MFG.
COMPANY**

**Builders Since 1879
157 DIVISION ST. CHICAGO, ILL.**

w taps
ht and
y taps
mud or
spindle
ream-
hand
s, job-
s, flut-
taper
earners
d shell
so on.
mation
ul taps
ons, as
cutting
and tap
meas-
so on.

d Con-
publ-
sh-
ury 91.
d con-
93, for
essure.
y, and
15 free

es

DS

peed
athe
ried-

qual-
ndle
ake,
600-
and

RNE.

day.

,.

ILL.

ry, 1945



REPORT TO SAFETY DEPARTMENT

NAME • John J. Smith
DEPARTMENT • Maintenance
DETAILS OF ACCIDENT • While sawing overhead, the blade broke. Employee fell from the ladder injuring his ankle.

Joe Costa
Dept. Mgr.

PREVENT ACCIDENTS TO YOUR MEN



REPORT TO SAFETY DEPARTMENT

NAME • Wm. H. Brown
DEPARTMENT • 38-L
DETAILS OF ACCIDENT • Hand hack saw blade broke while cutting pipe. A piece of the blade drove into his hand, which resulted in a bad cut.

W. G. Ryan
Foreman

"LENOX"

THE SAFETY HAND BLADE SENSATION
made of Molybdenum High Speed Steel

Hackmaster

Reg. U. S. Pat. Off.

BREAKAGE ELIMINATED. Inasmuch as this is an unbreakable blade it will withstand hard usage, even misuse, without shattering. Sharp twists and kinks, which are the main reason for saw breakage, are absorbed without damaging this blade.

ADVANTAGES. May be used under all awkward sawing conditions, or by inexperienced men, with complete satisfaction and fast cutting speed.

Buy Through Your Mill Supply Distributor

AMERICAN SAW & MFG. CO.

SPRINGFIELD 1, MASS.

Hackmaster ●



HERE IS A CUTTING-OFF BLADE READY TO USE !

Note All These Distinctive Advantages



T-shape provides liberal side clearance.
Excessive friction eliminated.



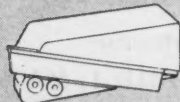
Tapered blades have back and side clearances full length of blade.
No resharpening, but front face, required.



Hollow-ground top causes chip to collapse and relieve friction against sidewall of cut.



Thus collapsed, the chip is drawn away from sidewalls and permits coolant to reach cutting edges of blade. Friction reduced.
Blade life increased.



We have holders to fit any standard hand and automatic screw machine. Blades are locked in holders by two developed cams. Releasing of blades for resharpening never disturbs initial setup. Efficiency of blades maintained till they are reduced to within one inch of their original length.

... and when we say "Ready to Use," we mean you can put it on your machine—any standard automatic or hand screw machine—in a minute you get it—and you're ready to go. You don't have to spend a second's time to grind in your clearances. They're already there—back and side—and besides, the top is hollow ground to collapse the chip and relieve the excessive friction.

TODAY, you don't have to buy a cut-off blade on which you must spend time to prepare it for use.

Send for Complete Catalog

Buy an EMPIRE TOOL COMPANY'S LATEST PATENTED CUTTING-OFF BLADE

No other cut-off blade offers the convenience in operation, the efficiency in performance, and the economy in use.

Our engineers (located in principal cities) will gladly call at your request to assist you in simplifying your cutting-off operations—save time and increase production. Blades, both tapered and parallel on longitudinal cutting width, carried in stock. Shipped immediately.

BUY WAR BONDS

EMPIRE TOOL COMPANY MANUFACTURED UNDER PATENTED CUTTING-OFF BLADES AND HOLDERS UNDER LICENSE TAKEN BY JOHN H. LLOYD PATENT CO., INC.

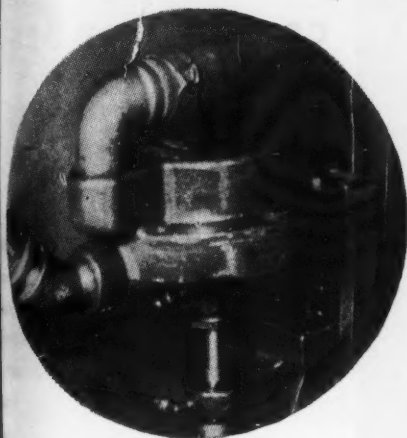
Also manufacturers of Empire Floating Tool Holders and distributors of Rigid Live Center, Fastcut Centrifuge, and Keyseat Cutters.

EMPIRE Tool Co.
8774 GRIMMILL AVE.
DETROIT 13, MICHIGAN

COOLANT PUMPS



BY - PASS VALVES



**Coolants Maintain
Even Flow with**

FULFLO COOLANT PUMPS

IMPORTANT to know . . . and just as important in practice these days (and nights) of almost constant, unflagging use . . . when machines are doing so much to win wars in every land and on sea. FULFLO COOLANT PUMPS are obtainable with right or left rotation; direct, belt or motor driven. Master motors with special patented seal. Pipe sizes $\frac{3}{8}$ " to $1\frac{1}{2}$ ".

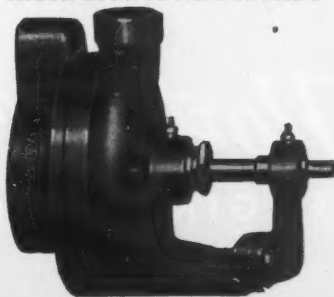
**For Constant
Pressure . . .**

FULFLO NON-CHATTERING BY-PASS VALVES

For oil hydraulic pumping units.
Standard or flange types.
Pipe sizes $\frac{1}{4}$ " to 2".

**Write for The Fulflo
Mechanical Data Book**

• • •
Illustrated is Model FRS4



Specialties Co., Inc.
BLANCHESTER, OHIO

MOTOR TRAVEL FOR

HAND TRAVELED
CRANE BRIDGES

The *Northern* "Travelator"



Northern
ENGINEERING
WORKS

2615 Atwater Street, Detroit, Michigan
Offices in Principal Cities

Northern Crane & Hoist Works Limited,
Windsor, Canada

Less than half a day required for application—no dismantling of crane—any good mechanic can apply the Northern "Travelator."

It provides pendant push button controlled electric power travel for hand traveled bridges within the range of 10 tons capacity.

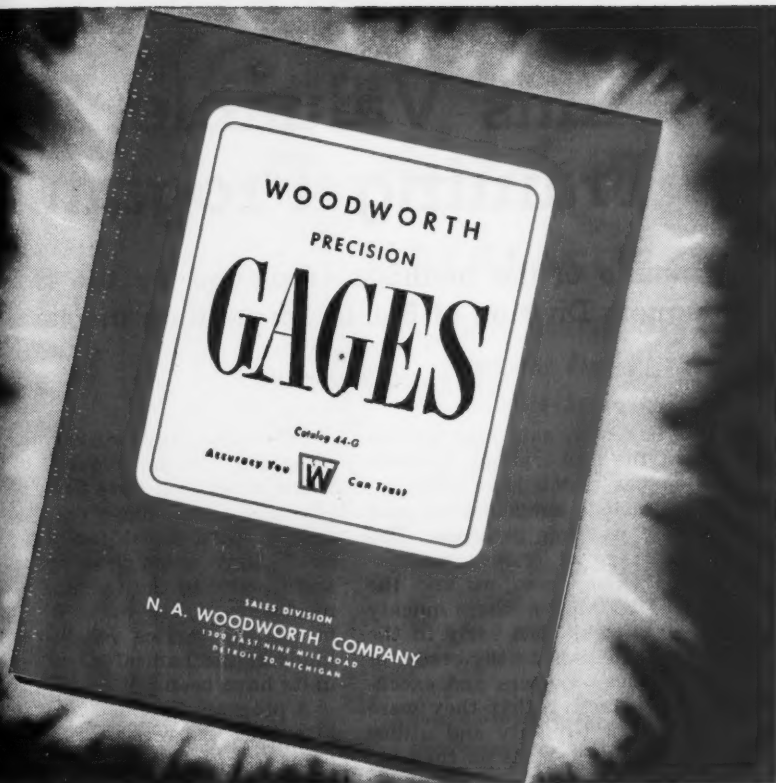
The "Travelator" is an inexpensive, thoroughly effective durable device.

Write
FOR BULLETIN

A
The new
to gage u
tion on V
cess with
Carboloy
due "bre
worth Lin
18-28 Sta
other imp
production

N. A.

January, 1945



A New Catalog of Gages by Woodworth

The new Woodworth Gage Catalog is now available to gage users. This catalog contains complete information on Woodworth gages, shows you how to reduce costs with gages of cast Stellite alloy, tells about the Carboly gages with the exclusive segmented shank that "breathes" and the story of the famous Woodworth Limitrol comparator gage. For the first time, the B-28 Standards Data is compiled in a catalog, also other important gage data that will help you to speed production and reduce costs. Write for your copy today.

N. A. Woodworth Co., Sales Division
1300 E. 9 Mile Rd., Detroit 20, Mich.
Gentlemen: Forward a copy of the
new Woodworth Gage Catalog to—

Name _____
Position _____
Company _____
Address _____
City _____ State _____

ACCURACY YOU  CAN TRUST

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD • DETROIT 20, MICHIGAN

PRECISION GAGES • PRECISION MACHINED PARTS • PRECISION TOOLS

Films Valuable In Training Program

An outline of the methods employed by the Scintilla Magneto Division of Bendix for training mechanics.

By LYNE S. METCALFE

MUCH has been said and written about the new training methods and techniques which have been developed in various industries to meet the needs of wartime pressure. The coming shortage of trained machinists and machine operators and the necessity of training workers quickly and efficiently was seen early in the emergency, and it is to the credit of the machine shop owners and executives of this country that they were among the first to study and utilize all promising innovations as they became available.

Of course, any workshop training practices and techniques which are sound and which have been proved by experience to achieve results may be applied with equal facility to practically any machine shop operation, and equally to the training of service mechanics whose tasks it will be to install and service various types and kinds of mechanical units once those units have been put to use.

A program that has attracted much attention, and which offers many valuable suggestions for training mechanics, is that used by the service

Fig. 1—The classroom is equipped with benches facing the picture screen.



ready dou
and in the p
ple in your
for Simon
the dealer, c

MAIN OFFICE
Chicago 7, I
Atlanta 4, G
Indianapolis 6, I

PROD
FOR
PAP

*Get Faster, Smoother,
More Accurate*

METAL-CUTTING

◀ **with SIMONDS Segmental
Saws for Fine Pitch and
Extra-Smooth Cut**

These saws cut straight and true under highest pressure, without vibration or chatter. Saw plate is specially heat-treated so as to be practically unbreakable. And the high-speed cutting segments are tongued into the groove in the plate, then held in place by 5 rivets each. This construction gives highest tensile and torsional strength . . . gives *you* extra cutting life . . . and enables you to make ready replacement of the interchangeable cutting segments.

Simonds Segmental Saws combine the best features of all similar types of fine-tooth saws . . . plus the exclusive feature of a special Simonds high-speed steel, specially heat-treated to withstand the overloading commonly encountered on high-production cutting jobs.

◀ **with SIMONDS
Inserted-Tooth Saws
For Heavy Cuts**

These circular saws have curved gullets and high-speed steel teeth . . . with a wedge for every tooth . . . to provide greater cutting speed, feed, and depth of cut. Production

usually double that of solid-tooth saws. Inserted teeth can be sharpened in the plant, or can be replaced when necessary by a mechanic in your own plant.

Order Simonds Segmental and Inserted-Tooth Circular Saws from your dealer, or from the nearest Simonds office listed.

REGIONAL OFFICES: 1530 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 228 First Ave., San Francisco 3, Calif.; 511 S. W. First Ave., Portland 4, Ore.; 520 First Ave. So., Seattle 4, Wash.; 31 W. Treat Ave., Spokane 9, Wash.

SHORTEN THE WAR... BUY BONDS



**SIMONDS
SAW AND STEEL CO.**

FITCHBURG, MASSACHUSETTS

PRODUCTION TOOLS

FOR CUTTING METAL,

WOOD,

PAPER, PLASTICS



Fig. 2 — Each step in a machine operation or assembly operation can be illustrated on the screen. The instructor uses a "chest mike" which enables him to project his voice through a microphone while walking about the floor.

department of Scintilla Magneto Division, Bendix Aviation Corporation, Sidney, New York. The pattern established in this course is adaptable to any form of machine shop training, and it might be said in passing that the Division has arranged to make this teaching material available to any aircraft plant, aircraft school, engine manufacturer, or airline facing the problem of training aircraft magneto service mechanics in the installation, care and repair of these units.

The visual factor in this program—and an important one—is a series of seventeen discussion-type slide films which were produced for the purpose by the Jim Handy Organization, Detroit, Michigan. This type of film, it might be explained, is a strip of 35 mm. safety motion picture film on each segment or "frame" of which is a picture which may be a special photograph, drawing, chart, diagram, or other pictorial pattern or exhibit, with the necessary letterings, labels, and legends superimposed on the film

point for elaboration, study, or discussion of detailed ideas, points, or facts. The value of the Scintilla mechanic's training program lies chiefly in the manner in which films have been directly tied-in with machine shop demonstrations and work projects under supervision in plant schools.

Newly-registered students at the Sidney plant are usually grouped in classes of approximately twenty. They first get an introduction to the electrical theory of modern aircraft ignition through projection of a series of slide-films on "basic electricity." An understanding of basic electricity is important because the magneto is a special form of alternating current generator, and the slide film has been found especially valuable in getting the theory across more quickly and without confusing detail.

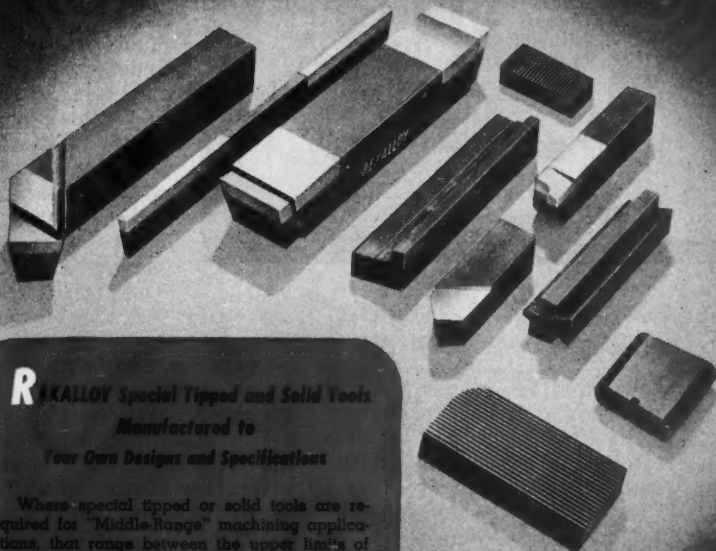
Having absorbed the theory of basic electricity, the student is ready for a more practical approach to the principles of magneto operation. The instructor points out the differences

for the purposes of explanation or to amplify its meaning.

One of the advantages of such a film for purposes of machine shop training is the opportunity afforded the instructor to pause at any

REXALLOY

STANDARD TOOL BITS • STANDARD TIPPED TOOLS • SPECIAL TOOLS—TIPPED AND SOLID • CASTINGS



REXALLOY Special Tipped and Solid Tools Manufactured to Your Own Designs and Specifications

Where special tipped or solid tools are required for "Middle-Range" machining applications, that range between the upper limits of high speed steel and the lower limits of tungsten carbide, it pays to use REXALLOY. Crucible is in a position to furnish special REXALLOY tools, tipped or solid, to meet your requirements. Too, REXALLOY Service Engineers are prepared to assist your engineers in the design of such special tools to secure the full advantages of REXALLOY in increased speed, feed or depth of cut, better work with fewer grinds.

To enable an appraisal of REXALLOY'S advantages, your nearest Crucible Branch will gladly arrange for a competitive demonstration in your plant by a REXALLOY Service Engineer.

Get the facts about REXALLOY... let us prove them to you. Mail the coupon today.

Buy More Bonds Than Before

CRUCIBLE STEEL COMPANY

Crucible Steel Company, Inc., 405 Lexington Ave., New York 17, N. Y.
Branches, Representatives and Distributors in Foreign Cities

TYPICAL SPECIAL REXALLOY TOOLS MANUFACTURED TO CUSTOMERS' SPECIFICATIONS

Crucible Steel Co. of America
405 Lexington Ave., N. Y. 17, N. Y.

- ☐ Please mail me your new 28-page book, "REXALLOY CUTTING TOOLS".
- ☐ We would like to discuss the possible use of REXALLOY in our plant.

Name

Firm

Address

MM 1

City

"FULL-RANGE"
QUALITY STEELS



of America

HIGH SPEED • TOOL • STAINLESS • ALLOY
MACHINERY • SPECIAL PURPOSE STEELS

MODERN MACHINE SHOP 181

January, 1945

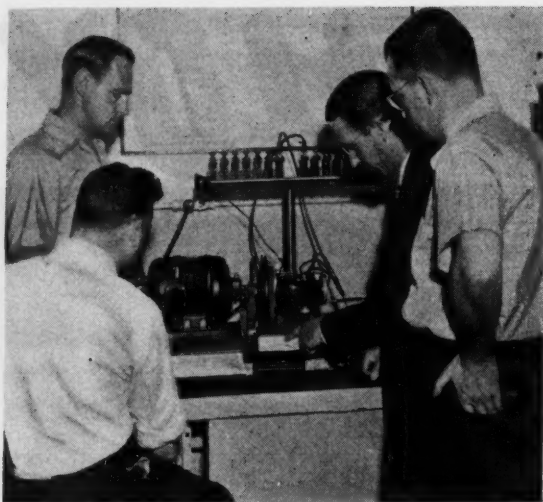


Fig. 3—Testing a magneto after it has been disassembled and reassembled by the student.

in various types of magnetos, and explains variations in maintenance procedure.

Following this lesson, the class is shown what is inside the magneto. This is done with the aid of slide films, and the class receives a preliminary outline of overhaul procedures and of the uses of the special tools that are employed in this work. This instruction saves much time later when the students arrive at the workbenches.

The Scintilla classroom is equipped with a sufficient number of benches for the class, each equipped with a full complement of the tools that will be needed. Operational films are repeated here while the class follows, step by step, and with working parts and tools before them, the procedures pictured on the screen.

A period devoted to questions and answers and general discussion follows the "overhaul" session. Any steps the student mechanic may have missed can now be repeated and the instruction can be augmented by the use of wall charts, the units them-

selves, drawings, and other teaching aids.

The next order of procedure is a test in which the student must show that he understands clearly the instruction he has received up to this point. The student must disassemble and assemble a magneto, after which each magneto is tested by meter to determine the efficiency of the magneto by the output. This test shows students

any errors that they may have made, spurs interest by injecting a spirit of competition, and helps them to understand the problems involved in the operation and servicing of the units.

It is readily apparent that the program outlined here offers teaching techniques that could well be adapted to the training requirements of the machine shop. Before the pressure of the present emergency forced the cutting of corners in training, a four-year course of training was generally considered to be necessary for the making of a full-fledged mechanic. In the past three years we have found that, by intensive training, this time can be cut by half, and perhaps even more.

The time-honored system of indenturing an apprentice for a four-year term of instruction and then forcing him to waste from one to three years of that period in sweeping floors, piling stock and performing various other unproductive tasks is wasteful; if a young man has the educational background and potential ability to become a good mechanic, he should be

.0005"

Fine accuracies can be secured only through the use of machines built to maintain exacting specifications.

**PRECISION IS
OUR BUSINESS**

For over 57 years Sebastian has built lathes exclusively

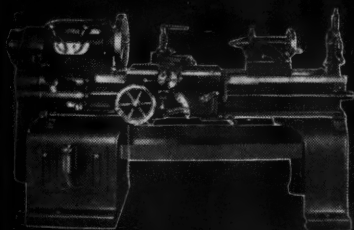
*"Best Lathe In The
Medium Price Field"*

SEBASTIAN LATHES

Manufactured by

STOKES INDUSTRIES, Inc.

COVINGTON, KENTUCKY



NEW YORK CITY
238 BROADWAY
Tel.: BARCLAY 7-3318



WASHINGTON, D. C.
529 UNION TRUST BLDG.
Tel.: DISTRICT 5382



CHICAGO, ILLINOIS
541 WEST WASHINGTON BLVD.
Tel.: STATE 3092

trained as fast as he can absorb the instruction. The time formerly required to instruct apprentices by having each one watch a journeyman mechanic perform each individual operation can be reduced considerably by the use of films which can be viewed by an entire class at one sitting. Further; the film can be viewed as long and as many times as may be required.

The slide-film offers an advantage for training purposes that should be accepted wherever class instruction is a part of plant operation.

(Illustrations Courtesy Jim Handy Organization.)

Kennametal Catalog 44. A 48-page catalog relative to cemented carbide tools, blanks, and specialties has been prepared by Kennametal Inc., 300 Lloyd Ave., Latrobe, Pa. Feature of the catalog is a graphic index on the cover which provides a quick means for locat-

ing of any tool or product.

Among the tools and products for which illustrations, descriptions, specifications, and prices are presented are straight turning tools, offset turning tools, "lead angle" tools, facing tools, cut-off tools, square nose tools, pointed nose tools, "shear-angle" tools, "clamped on" tools, roller-turner tools, square shank boring tools, round shank boring tools, solid round tools, solid square tools, solid rounds, lathe and grinder centers, lathe files, tool blanks, Kennamills, face mills, adapters, shell end mills, spar mills, half side mills, comb side mills, side mills, slab mills, stagger tooth cutters, bi-negative cutters, slitting saws, and specialties for wear-resistant applications.

Also included in the catalog is information on the manufacture and uses of Kennametal; how to specify and order Kennametal special tools; chip breakers for Kennametal tools; grades and applications of Kennametal; tool wear analysis; rough and finish grinding Kennametal tools; how to avoid grinding cracks in Kennametal tools; furnace and torch brazing Kennametal blanks to tool shanks. Copy of Catalog No. 44 free to executives upon request.

To Speed Victory! WE ARE READY TO SERVE YOU!

"**American**"

Cold Pipe, Conduit and Tube Bending Machines

Twelve types to select from. Hand operated capacities $\frac{1}{4}$ to 6" inclusive. Motor operated $\frac{1}{2}$ to 8" inclusive.

A few of our More Than 12,000 Customers:

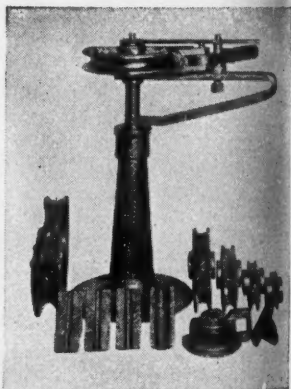
Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Calif.; Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster Engineering Corp.; E. I. Du Pont de Nemours & Co.; Louisiana Shipyards; Westinghouse Elec. & Mfg. Co.; General Motors Corp.; Carnegie-Illinois Steel Corp.; Henry Ford Company.

Quick Deliveries

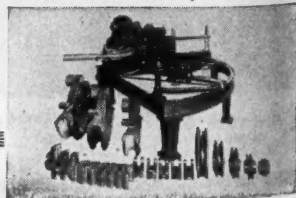
"**American**"

PIPE BENDING MACHINE
Company INC.

25 PEARL ST. BOSTON, MASS.

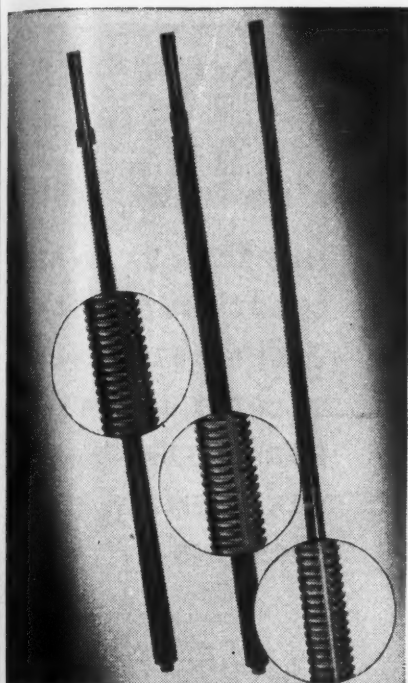


Write Air Mail for printed matter

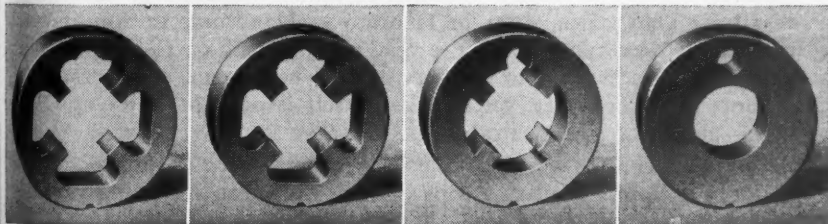


cts for
speci-
ted are
turning
g tools
pointed
clamp-
square
boring
square
grinder
Kenna-
ell end
, comb
stagger
s, sili-
rear-re

is in-
nd uses
ty and
; chip
grades
; tool
grind-
avoid
tools;
ametal
Catalog
equent.



56 inches long overall, the above three broaches were used to perform the operation illustrated below.



Oper. No. 3. Third pass or finish broach. This broach establishes size and finish on spline widths, radii and flats.

Oper. No. 2. Second pass broach 1.800 to 2.238 leaving stock for finish broach.

Oper. No. 1. First pass broach cuts from 1.270 to 1.800 leaving a wide spline.

Blank before broaching, sides ground, small hole drilled and large hole drilled to receive pilot of broach.

*Now, it takes
only $\frac{1}{40}^{th}$ the time
to perform this
operation!*

**New method of producing cutting face
and chip area in threading dies**

Here is a graphic illustration of how the U. S. Broach engineers solved one manufacturer's production problem, by designing these clover leaf shaped broaches to save him valuable man and machine hours.

If you have a problem in the precision cutting of production parts you will find that our engineers' wide experience will be helpful to you in affecting greater economy in your plant.

A letter will bring you full information about our organization.

U.S. BROACH
Company



6465 E. SEVEN MILE ROAD

DETROIT 12, MICH.



TELEPHONE TWINBROOK 1-2211

ry, 1945

January, 1945

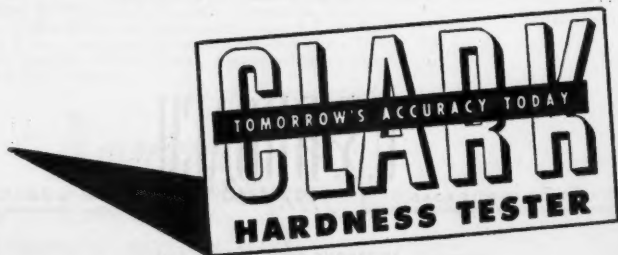
MODERN MACHINE SHOP 185

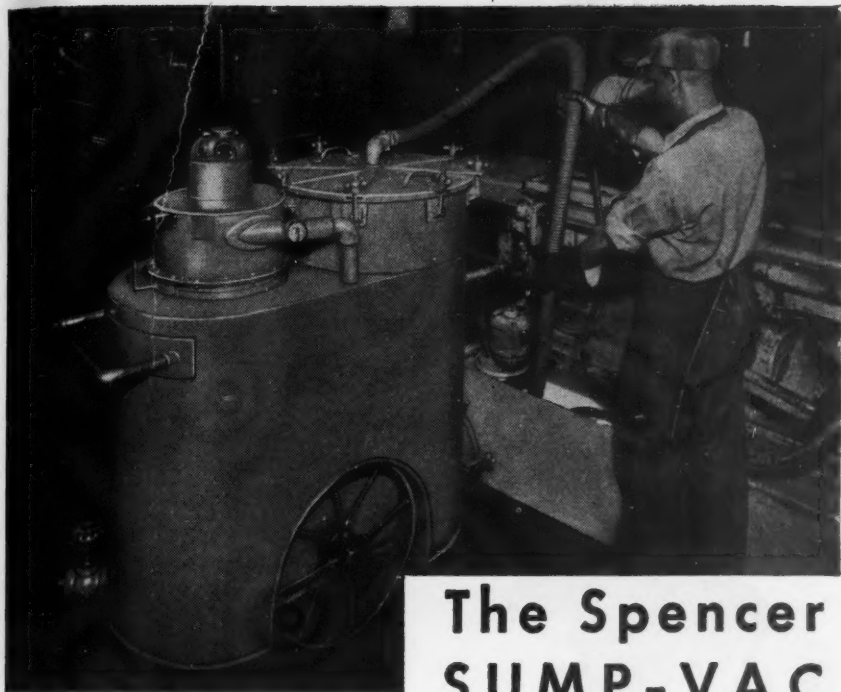
FREE!

**THIS 24" x 32" WALL
CHART GIVES ROCK-
WELL, BRINELL,
SCLERO, VICKERS
HARDNESS AND TEN-
SILE STRENGTH CON-
VERSIONS —**

If you are a production executive whose responsibility includes the hardness testing of metals, you will certainly want one of these new charts for your office, shop, or laboratory. Handsome in appearance, printed in three colors, with the very minimum of advertising, it will prove its value every hour of every day. Type is large, easily read at a distance of several feet, yet the chart itself is only 24" wide and 32" high—about the size of a calendar.

Although a chart like this is relatively expensive to produce, and the quantity is rigidly limited, a copy is yours—free for the asking—if you request it on your letterhead. Write Dept. MM, CLARK INSTRUMENT INC., 10200 Ford Road, Dearborn, Michigan.





The Spencer SUMP-VAC

Cleans Sumps in 2 to 10 Minutes

A portable vacuum producer with a 125 gallon tank, on wheels, picks up liquid at the rate of 40 gallons per minute. Machine emptied by gravity in 2 minutes or elevates liquid by pressure up to 6 feet.

Filter basket collects chips, float valve prevents overfilling. No priming necessary. $\frac{3}{4}$ and $1\frac{1}{2}$ H.P. models. Ask for the bulletin.

SPENCER VACUUM
HARTFORD
CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

**FASTER
FINISHING
WITH
CLECO
LIGHT
GRINDERS**



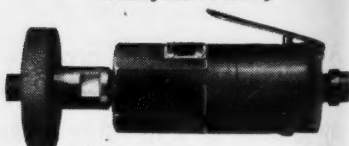
● For finishing forgings, dies, metal patterns, castings and similar work, you can't beat Cleco Light Grinders. They are light in weight, small and easily handled, yet pack plenty of power. The No. 214 series of Cleco Grinders is available at speeds of 14,000 and 18,000 R.P.M. and are governor controlled, while Model 12 is faster at 20,000 R.P.M. Fitted with $\frac{3}{8}$ " 24 S.A.E. thread spindles. Exhaust deflector included.

Standard equipment consists of spindle nut and washer, and $\frac{1}{4}$ " collet chuck. Spindle extension $1\frac{1}{2}$ " or 3" long furnished, in lieu of collet chuck, when specified. Dead handle supplied when so ordered.

Bulletin 80 describes these light grinders in detail, as well as furnishing complete data on the entire line of Cleco Rotary Grinders. Ask for #1



Working inside a casting.



Above, a Cleco 214J light grinder. Below, a Cleco No. 214 smoothing up an aluminum casting, with a rotary file.

THE CLEVELAND PNEUMATIC TOOL CO.

3781 East 77th St. • Cleveland 5, Ohio

Branch Offices in All Principal Cities

Less SET-UP TIME



More WORKING TIME

... FOR YOUR PUNCH PRESS WITH THESE DICKERMAN FEEDS

These accurate, automatic feeds require no connection with the power shaft of your punch press. They save labor time and material waste, both for day-in-and-day-out production and on short runs.

The Dickerman Hitch Feed

1. Feeds from any position on any style die.
 2. Saves time on both long and short runs.
 3. Offers positive feed control, adjustable from 0" to its limit.
- Made in two sizes, 2" and 4" Feeds
Send for booklet

The Dickerman Die Feed

1. Handles coiled stock up to $\frac{3}{4}$ " thick, widths up to 4".
 2. Adjustable from 0" to its maximum feed length in increments of .001".
 3. Fasten three screws — and it's mounted on your die set.
- Write for booklet

H. E. Dickerman Mfg. Co.

321MM ALBANY STREET

SPRINGFIELD, MASS.

Look for the True Rake

One tool angle by itself does not describe the rake of a face mill cutting tooth, or of a lathe tool, unless that angle is the resultant of three components.

Here's why:

By M. KRONENBERG, ENG.D.
Research Dept., The Cincinnati Milling Machine Co.

A RECENTLY gathered group of production engineers seemed surprised to hear these three statements:

"A face mill with its teeth set at a 10 degree negative radial rake angle may in effect be cutting with a positive rake."

"When the axial and radial rakes are both positive or both negative, the true rake may be greater than either one of them."

"The true rake of a cutter can be varied many degrees without changing either the axial or radial rake."

These strange statements are explained by the fact that the "True" rake is an angle which is the resultant of three others—the radial rake, the axial rake, and the corner angle. To describe a cutter by means of only the first two of these components is insufficient.

True rake is measured at right angles to the projection of the cutting edge on the reference plane. In general it serves as a useful index to cutter performance since it affects not only the tool life but also the finish quality of the work, the power consumption and the deflection of the

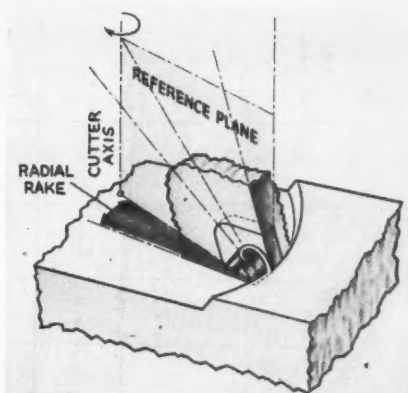
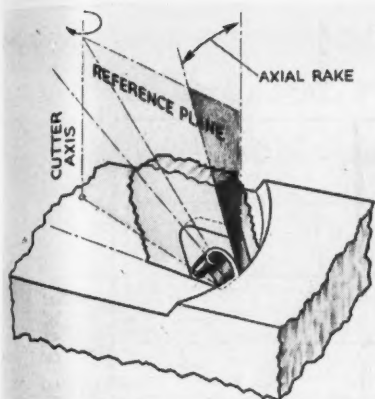
machine. In extreme cases where the cutting edge is greatly inclined to the reference plane, its angle of inclination must also be considered in estimating cutter performance.

Since it is therefore necessary for the practical designer and user of cutters to think in terms of true rake, it is desirable to have some easy means for determining what this significant angle will be for a given combination of its three components.

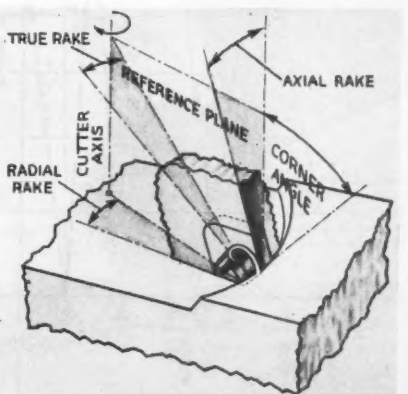
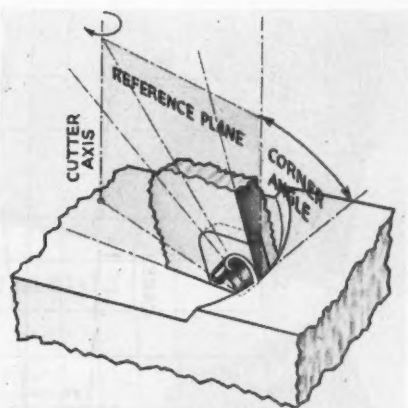
The alignment chart on page 192 permits the reading of the value and variation of any one of the angles if the three other angles are given or varied. It is necessary only to lay a straight edge across the chart connecting the values for the given angles.

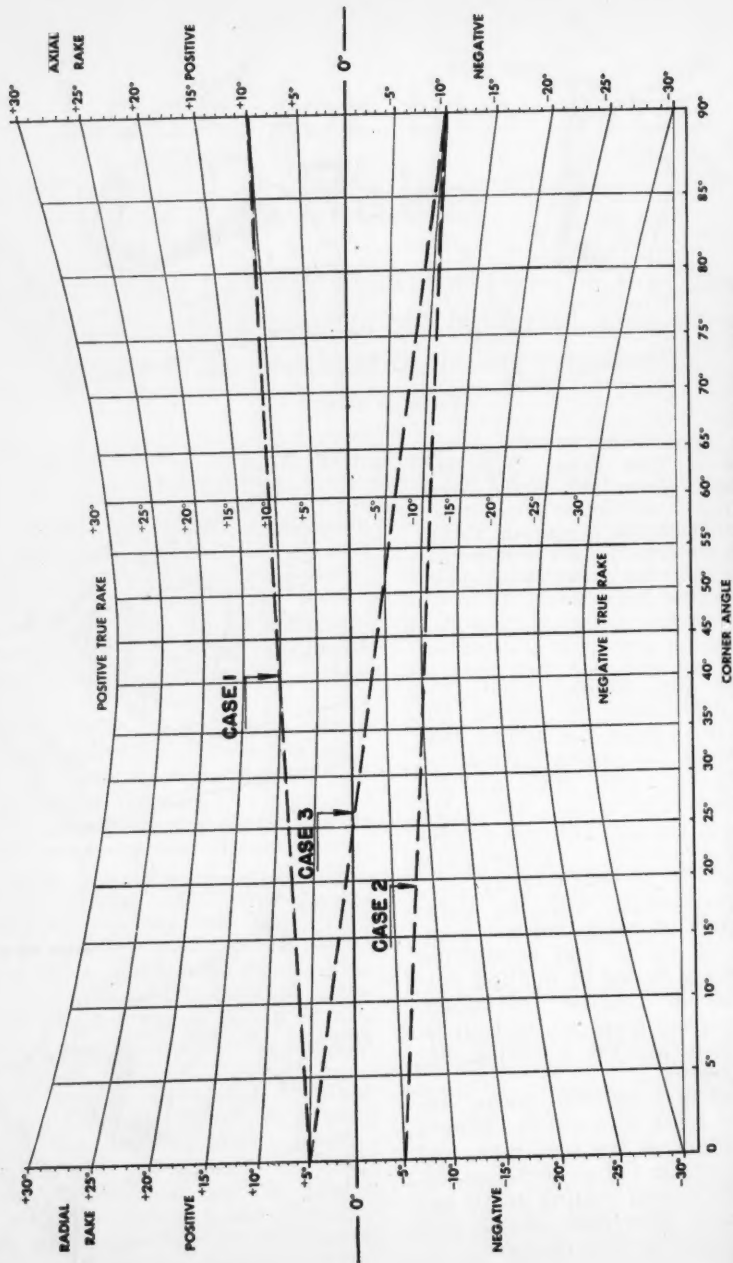
If the true rake is to be determined, the given value of the radial rake should be connected with the value of the axial rake. The true rake can then be read for any value of the corner angle at the intersection of the rulers' edge with the vertical line.

If, on the other hand, a certain value for the true rake is desired and the corner angle and radial rake



Three values enter into the determination of True Rake: those for Axial Rake (above left), Radial Rake (above right), and Corner Angle (center right), both the component rakes shown in the drawings are negative so that they result (as shown below) in a Negative True Rake.

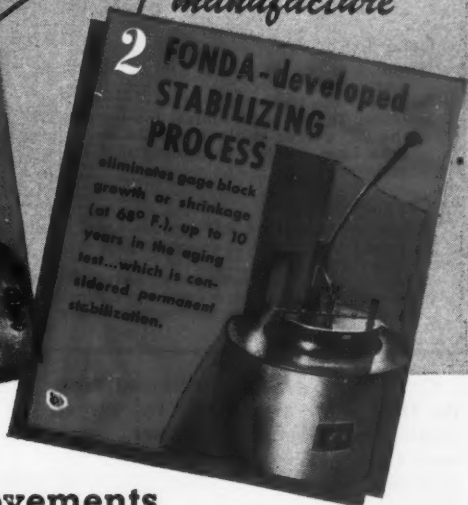




ALIGNMENT CHART FOR DETERMINING TRUE RAKE

NOT ONE-BUT TWO

major developments in gage block manufacture



What do these improvements mean to you?

These FONDA "Ultra-Finish" gage blocks are processed to such extreme surface smoothness and accuracy that they require no oil or other film for wringing. No peaks to wear off and reduce block size . . . no films between stacked blocks, to introduce other errors. Faster wringing! Longer wear! And safer, surer protection for your production accuracy standards.

It means that you can obtain—at no premium on price—the same fine-precision FONDA gage blocks such as are used constantly by the National Bureau of Standards and leading laboratories, for sustained high accuracy in critical measurements.

Prompt Deliveries

FONDA GAGE COMPANY
STAMFORD, CONNECTICUT

Agents in All Principal Cities throughout the World



PASSED
HIGHEST TESTS
DEvised BY THE
NATIONAL BUREAU
OF STANDARDS



For a helpful summary of new modern developments in gage block manufacture, write for BULLETIN D

FONDA Gage Blocks

ALSO FONDA PRECISION GAGES:
Dial, Plug, Ring, Snap, Profile, Flush
Pin, etcetera . . . all types except
Thread gages.

Examples

Case 1—

Given: a radial rake of $\pm 5^\circ$ and an axial rake of $\pm 10^\circ$.

Required: the corner angle which will give a true rake of $\pm 10^\circ$.

Solution: The point of intersection between the straight edge (yellow line) and the $\pm 10^\circ$ rake line falls between the 35° and 40° corner angle vertical line (arrow), indicating about 37° for the required corner angle.

Case 2—

Given: a radial rake of -5° , an axial rake of -10° and a corner angle of 20° .

Required: the true rake.

Solution: The point of intersection between the ruler's edge and the 20° corner angle line falls between the -5° and -10° rake lines (arrow) indicating that the true rake is approximately -8° .

Case 3—

Given: a radial rake $+5^\circ$ and an axial rake of -10° .

Required: the range of corner angles which will result in negative rakes.

Solution: The ruler's edge dips below the zero rake line at the 20° corner angle line (arrow), indicating that the true rake will be negative for any corner angle greater than 26° .

C. On a tool with a rounded nose, the true rake varies along the curved portion because the corner angle varies from point to point of the cutting edge.

D. The true rake will always be positive if the axial rake and the radial rake are both positive; it will always be negative if these rakes are both negative. The true rake, however, can be either positive or negative if the axial and radial rake have opposite signs.

E. Changing the radial rake will appreciably alter the true rake if the

rake" by "side rake."

When collecting production data it will often be useful to plot tool life vs. true rake; this will not necessarily give a straight line, because of the influence of other factors such as friction. Such plotting will allow judging and improving results which might be difficult to comprehend.

Best Tools No. 41 Universal Radius and Angle Dresser is the subject of a well illustrated and descriptive folder issued by Best Tools Corp., Rockville Centre, N. Y. Copy free upon request.

corner angle is small, but will have little effect if the corner angle is large. Conversely, changing the axial rake will have little influence on the true rake if the corner angle is small, but an appreciable effect if the angle is large.

The alignment chart and conclusions hold also for lathe tools, if the term "axial rake" is replaced by "back rake" and the term "radial

"OUTWEARS
the best
Bronze Metal"

20 years ARGUTO without
K.H. a drink—

ARGUTO OILLESS BEARING CO.

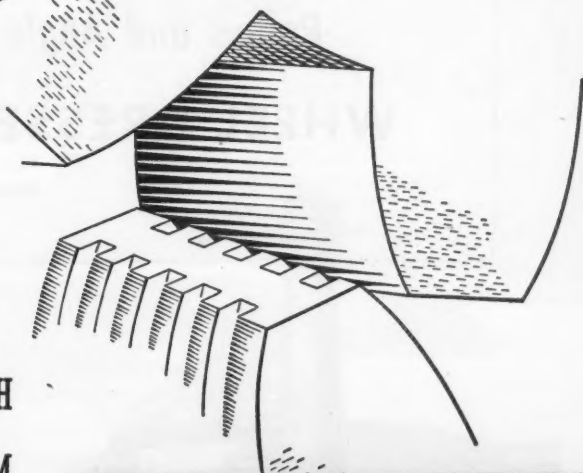
Wayne Junction, Philadelphia, Pa.

Now: CURVE-SHAVING

Available
exclusively on
Michigan Rack
and Rotary
Gear Finishers

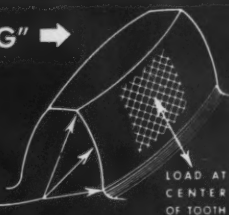
A
Finishing Process
which produces
Gears with
END-RELIEVED TEETH
having
TRUE INVOLUTE FORM
over their entire
length

With this process any desired amount of relief (to prevent end loading of teeth due to shaft deflection) can be quickly and accurately produced and re-produced automatically at one or both ends of the tooth without destroying correct involute form

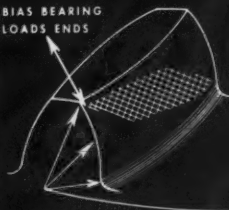


"CURVE-SHAVING" →

True involute over entire length of tooth (same curved relief at tip, pitch-line and root)



BIAS BEARING
LOADS ENDS



← ORDINARY "CROWNING"

If involute is correct at center, it will be high at one end, low at the other.

MICHIGAN TOOL COMPANY

7171 E. McNichols Road . . Detroit 12, U. S. A.

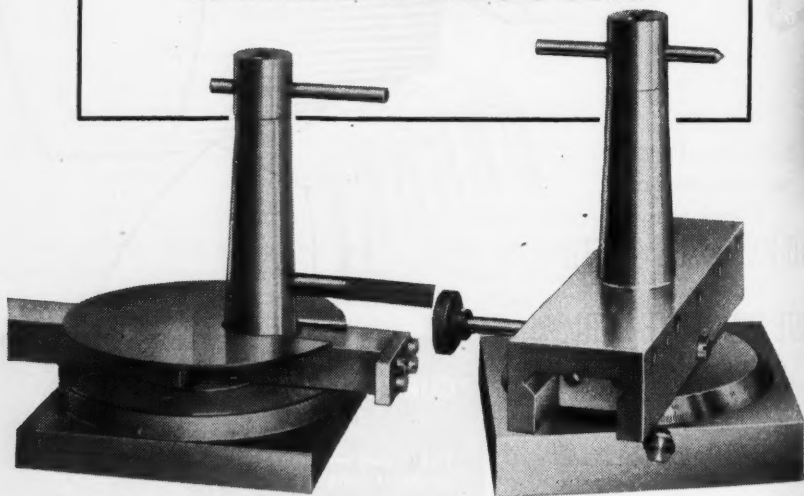
MODERN MACHINE SHOP 195

January, 1945

NEW TAFT-PEIRCE

Radius and Angle

WHEEL DRESSERS



For All Small Surface Grinders

TAFT-PEIRCE Radius Wheel Dresser

This fixture is essential for all contour grinding, such as special gages, form tools, and similar work. The rotating member is hardened and ground and is mounted on ball bearings. The diamond point for dressing the wheel is positioned on the center of rotation easily and accurately by means of a setting gage, not shown in the illustration but included in the price. Pins located on the base and the slide permit measurement of the exact radius to be developed. Like all Taft-Peirce products, this fixture is precision built throughout. Write for Bulletin No. 744.

TAFT-PEIRCE Angle Wheel Dresser

Wherever angular surfaces have to be developed, as in form grinding gages and form tools, this precision fixture is indispensable. It is built of steel throughout, with hardened base and slide. The dressing slide, which carries the diamond, is supported on a double row of balls rolling in V-ways. The base is graduated accurately through 90° either side of the center. Write for Bulletin No. 744, which describes and illustrates in detail all the precision attachments and accessory equipment made by Taft-Peirce for use with all small surface grinders.

THE TAFT-PEIRCE MANUFACTURING COMPANY

WOONSOCKET



RHODE ISLAND



Signs of the Times

ATTITUDES on civilian production schedules change quickly, but one thing you can depend on, when "Signs of the Times" point to peace... Sprayit and ElSCO products will satisfy your demands.

These products will come quickly too... simple reconversion problems...enlarged manufacturing capacities...mass production facilities...and a well trained organization will set in motion, complete cycles necessary for early delivery.

Never in the history of commerce has American business faced a condition like that to be encountered when full civilian demands are resumed. Orders will come from every corner...industry...stores...offices

...homes...everywhere. It is the purpose of Sprayit and ElSCO to release a steady flow of merchandise to these markets, and the finest products we have ever produced.

An outstanding new line of paint spraying equipment, air compressors, spray guns, insecticide sprayers, air tools, sanders, and allied finishing equipment will be made available to leading jobbers by Sprayit. And a fine line of electric motors, generators, hydraulic cylinders, valves, pumps and controls for aircraft, automotive and other industrial applications, will be produced for manufacturers in these fields by ElSCO. Your correspondence is invited.



ELECTRIC SPRAYIT CO.

SNEBOYGAN, WISCONSIN



IDEAS FROM READERS

Improved Stop Collar

By W. L. STEVENS

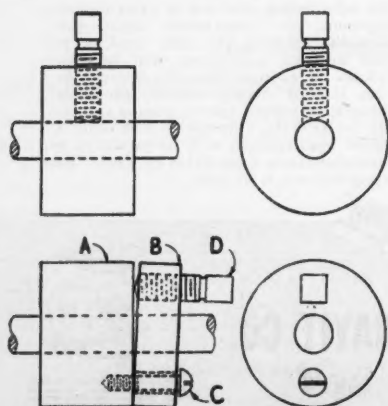
HEREWITH is a drawing of an improved stop collar that can be used on machinery, tools, jigs, or fixtures where an adjustable fixture is required.

Figure 1, in the upper part of the drawing, illustrates the design of the old type which makes use of a set-screw to hold the collar in place. However, when the screw is tightened sufficient to hold the collar in place, the rod is marred. Then, unless the collar is extremely loose on the rod, it becomes a difficult matter to move the collar to a new setting. Since the improved collar,

shown in Fig. 2, does not mar the rod, it can be made a snug fit on the rod and adjustments can be made quickly and accurately.

The improved collar is made in two pieces, in approximately the proportions shown in the drawing. The larger piece **A** should be bored to a slip fit on the rod, and should have a tapped hole, for the anchor screw **C**. The thinner piece **B** should be bored slightly larger than the diameter of the rod, so that it will be a loose fit. This piece should have a clearance hole for the anchor screw, and the clearance should be more than that which would normally be allowed since greater movement occurs during adjustment.

Opposite the hole for the anchor screw a hole is drilled and tapped for the locking screw **D**. This hole is required only in the thinner section. The collar is locked in position by tightening the locking screw, which tilts the section **B** until it binds on the rod, as shown. The anchor screw should not be drawn down tight, as play will be necessary under the head.



Drawing of Improved Stop Collar

Thumb Tack Extractor

By C. F. FITZ

DUE to the war effort we have found it necessary to employ a large number of women in our draft-



DURABONDED

TRADE MARK

This Startling Improvement in Coated Abrasives Gives **LONGER, COOLER CUTTING LIFE**

The latest Behr-Manning development, which hardens the adhesive bond, makes our metal sanding abrasives . . .

More resistant to heat — Less sensitive to humidity

A bond that resists heat gives more rigid support to the millions of cutting grains and also greatly retards any tendency to "load."

A bond less sensitive to humidity—whether the latter be in the material sanded, in the surrounding atmosphere, or both—extends cutting action for a longer time.

"DURABONDED" Coated Abrasives bring you both these advantages.

Reports from hundreds of metal sanding operations in the field—on high speed belts, discs and "gadgets"—show an average of 20% increase in cutting life at no advance in price.

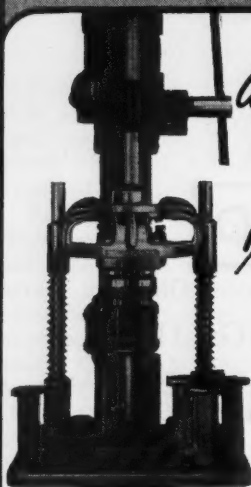
If you have not tried "DURABONDED" abrasives, use the coupon.

BEHR-MANNING (DIVISION OF NORTON COMPANY) **TROY, N.Y.**

We would like to know more about "DURABONDED" Coated Abrasives.

FIRM NAME	STREET
CITY	ZONE STATE
BY	TITLE

Drill Two Holes At Once



Adjustable
Centers
from
1/2" to 6"

Drill Capacity
0 to $\frac{5}{8}$ "

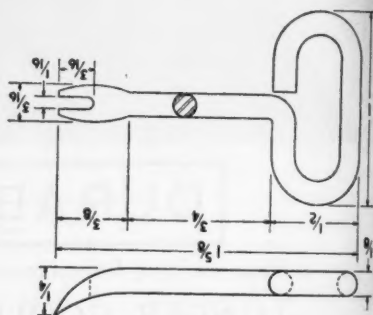
Quickly adjusted to desired drill
centers from $\frac{1}{2}$ " to 6".

Send for bulletin.

LINDERME
MACHINE & TOOL CO., INC.
12247 COYLE AVENUE
DETROIT 27, MICHIGAN

ing room to handle such work as ink-
ing, erasing, trimming, filing, blue-
printing, and so on. The women have
seemed to work out very well, but
they have a habit of losing the com-
mercial-type thumb tack removers—
which are impossible to obtain to-
day—and then they complain about
breaking their finger nails trying to
remove the thumb tacks.

We have overcome this difficulty by having the women bring from home the metal keys that are attached to various types of food contain-



Drawing Illustrating Manner of Grinding Off
End of Salmon Can Opener to Make a Thumb
Tack Lifter

ers, such as salmon cans. We have then had the machine shop alter the keys to the dimensions shown in the drawing. Trouble due to broken finger nails as a result of using them for tack lifters has been eliminated.

Special Filing Machine for Stator Core Slots

(Courtesy General Electric Company)

IN the manufacture of small instrument-type motors, it is necessary to file the edges of the slots in the stator cores to remove burrs and irregularities and thus facilitate winding. The file used for this operation must have



Planco CARBIDE THREAD MILLING CUTTERS

5

FIRSTS BY PLAN-O-MILL

- First to install General Electric's remarkable new Thy-mo-trol electronic feed control
- First planetary to mill external threads with standard multiple thread cutter!
- First planetary to coordinate feeds and speeds!
- First to provide absolute control of feed-in!
- First to offer a practical, low cost carbide thread milling cutter!

Attractive deliveries can be made on Plan-o High-Speed Steel Thread and Form Milling Cutters.

Now, to the proven speed and accuracy of thread milling, Plan-O-Mill brings you the proven *extra* advantage of cemented carbide. This tough, wear resistant material, forming the cutting edges of Planco Carbide Thread Milling Cutters, gives you greater accuracy, greater speed, and many more parts per grind. No tooling change is necessary.

Planco Carbide Thread Milling Cutters are available in National, Whitworth, Acme, V, and special forms, with or without provision for the Higbee cut. Both shank and shell type cutters are offered.

For increased production with maximum savings in time, money, and manpower—tool up today with Planco Carbide Thread Milling Cutters!

PLAN-O-MILL CORPORATION

1511 E. EIGHT MILE ROAD
HAZEL PARK, MICH.

THREAD AND FORM
MILLING MACHINES

THREAD AND FORM
MILLING CUTTERS

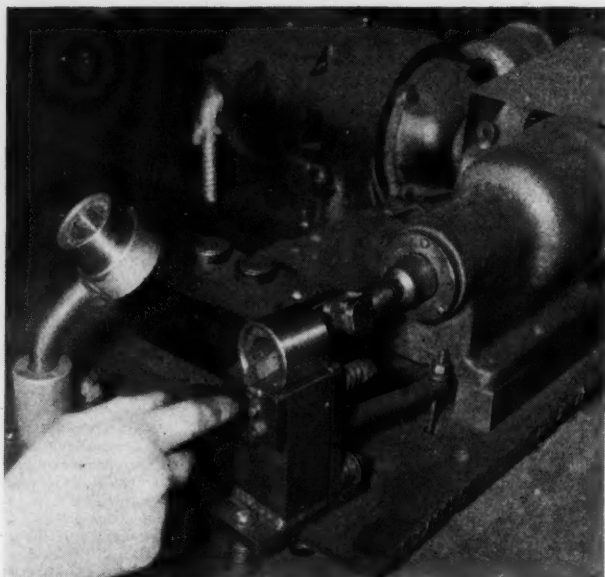


Fig. 1—Special Machine for Filing Stator Core Slots

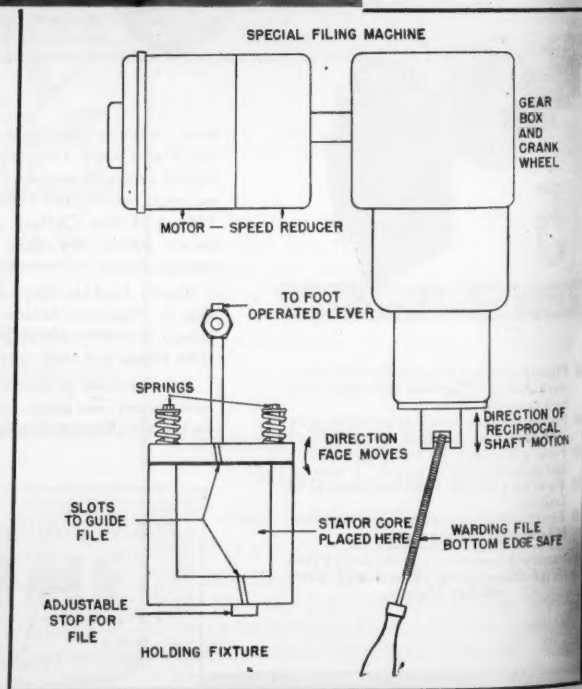
a "safe" edge on the bottom to prevent scoring the bottom of the slots, which would be detrimental to the magnetic properties of the core.

Until recently this filing operation had been performed by hand, but in order to eliminate the hand work and thus save both time and money a special filing machine has been designed by Joseph Geenens, an assistant general foreman at the Schenectady Works of the General Electric

Company. The machine is shown in Fig. 1, and Fig. 2 presents a diagram of the operating mechanism.

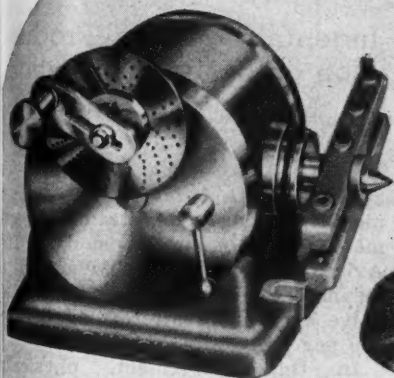
The unit assembly includes a tailstock assembly from a winding machine, a small motor with speed reducer, a holding fixture, and a file. The motor drives the advancing crank wheel of the center shaft of the tailstock, providing a reciprocal motion.

Fig. 2—Diagram of Special Filing Machine, Showing Arrangement of Parts

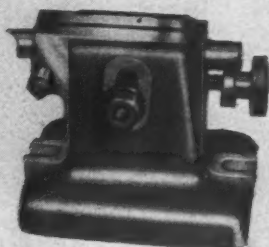
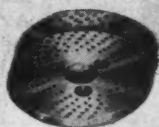


L-W DIVIDING HEADS

Astonishingly low priced, but high in quality, these new L-W 11" Universal Dividing heads give the utmost in accuracy at a cost lower than any similar piece of equipment on the market. Ruggedly built, constructed with many new features which increase their accuracy and their use for practical, profitable shop operation.



Model BP



HEADSTOCK — New, ruggedly designed for maximum rigidity. Can be swiveled to an angle.

TAILSTOCK — New design, heavier and stronger.

HEADSTOCK SPINDLE — Tapered bearings, bored for No. 10 B. & S. taper. Increased diameter and length. Threaded nose $2\frac{1}{4}$ " diameter 10 thread USS.

WORM — Made from special alloy steel, accurately finished, end thrust taken by ball bearings. Means are provided to make adjustment of worm wheel easily and accurately.

WORM WHEEL — Large diameter, 40:1 ratio, accurately generated, securely mounted on spindle.

EQUIPMENT — $\frac{1}{8}$ " table slot tongues, three index plates are furnished, dividing all numbers to 50, and even numbers to 100, with the exception of 96 T. The index chart furnished gives all divisions obtainable to 360.

MODEL BP FOR PLAIN
MILLING MACHINE

\$128.55

MODEL AU—FULL UNI-
VERSAL FOR COMPLETE
INDEXING AND SPIRAL
CUTTING

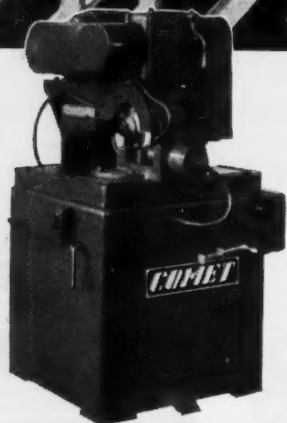
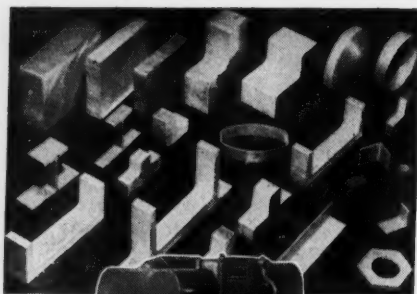
\$194.65

IMMEDIATE DELIVERY

L-W CHUCK CO.

20 N. ST. CLAIR ST.

TOLEDO, OHIO



CUTS METAL FASTER *More Accurately*

If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

CONSOLIDATED MACHINERY & SUPPLY CO., LTD.
2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

COMET
AUTOMATIC CUT-OFF MACHINE
MODEL MH

The file is attached to the center shaft, and is guided by a slot in the holding fixture. The workpiece is held by spring pressure in the holding fixture, and the file may be held in the core slot either by hand or by spring pressure. A stop on the fixture indicates when the slot-filing is complete, and also prevents interference with the bottom of the slot.

Ingenuity Double Production on Burring Operation

(Courtesy Lycoming Division The Aviation Corporation)

WHILE learning to overcome his physical handicap, a student member of the Rehabilitation Department at Lycoming Division of The Aviation Corporation developed a means of speeding up the burring of valve keepers for aircraft engines by 200 per cent.

In this department, physically handicapped applicants for job are taught methods of handling war work operations from which their handicaps normally would eliminate them. The importance of the student's idea in this case, although extremely simple in application, is emphasized by the fact that hand operations such as cleaning and burring of small parts take up production time in a ratio



NORGREN ROUND FERRULE COUPLING. No extra parts needed! Two-piece assembly, easily applied. Positive grip! Sure seal!

Write for catalog.
Denver 9, Colo.

Re-Usable
Norgren

X THERE'S A SPOT IN EVERY METAL-WORKING PLANT

for a



The Wells No. 8 Metal Cutting Band Saw doesn't need much floor space. Every plant has a spot for one—and what a *busy* spot that becomes—for a Wells is a machine that always finds plenty of work. You can use it for all the odd cutting jobs and free large production units. And you will find it accurate, efficient and economical on certain production runs too.

The Wells will cut most any shape, size or type metal you can get into it . . . quickly and with a minimum of labor. What's more, one of the Wells' best features is that it can easily be moved to any job to save the time and labor of bringing the work to the saw. You'll be wise to mark an X on the spot in your shop where you intend to put a handy Wells to work cutting metal economically and efficiently.



SPECIFICATIONS WELLS No. 8

CAPACITY: Rectangular	8" x 16"
(Special Guides)	5" x 24"
ROUNDS:	8" diameter
MOTOR:	1/2 H. P., current optional
SPEEDS:	Selective 60, 90, 130 feet per minute
WEIGHT:	Approximately 750 pounds

Wells SAWS
THE SAW OF CHOICE

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
808 TYLER STREET, THREE RIVERS, MICH.

MODERN MACHINE SHOP 209

r shaft,
holding
held by
fixture,
ore slot
ressure,
s when
also pre-
ctom of

duc-
tion

vities

ome his
student
Depart-
of The
oped a
ring of
ines by

rsically
it are
r work
handi-
e them.
s' idea
ly sim-
ized by
such as
l parts
a ratio

able

NG. No
sembly,
ell
en

ary, 1945

January, 1945

of about $2\frac{1}{2}$ to 1 of the total man-hours involved in general machine shop practice.

Valve keepers are small machined parts used to secure the valves in Lycoming aircraft engines, and must be burred inside and out. They are too small to be held satisfactorily by hand for buffing the outside and for scraping the inside contours, yet, by reason of their shape, which is that of a half cone with a shoulder mid-

way on the inside diameter, ordinary holding devices are not applicable.

To solve this problem, the rehabilitation student ground the pressure



**SEE
BETTER**

•
**WORK
BETTER**

•
**Keep hands
free**

CARL ZEISS INC.

$2\frac{1}{4} \times$ HEADBAND MAGNIFIER

Use of both eyes reveals true depth of details. Magnification of $2\frac{1}{4} \times$. Free working distance, 8" to 10", permitting unhindered use of hands. By just lifting your head, your eyes are free for any other activity. Eyeglasses may be worn while using. Highest optical quality. Eyeshade of Tenite—practically unbreakable. Write for leaflet.

CARL ZEISS, INC.

Dept. H51-1, 485 5th Ave., New York 17, N. Y.



Small Parts are Easily Held for Buffing by Gripping Them with Bull-Nose Pliers that have been Ground to Fit the Workpieces

face of a pair of common bull-nose pliers to fit the contour of the keepers, leaving a notch to clamp over the edge and thus hold them securely. By this means the inside angles of the keepers are easily accessible for scraping, and the parts are easily held for buffing.



HINGES

**VARIOUS WIDTHS
and GAUGES**



**BUTTS AND
CONTINUOUS LENGTHS**

WRITE FOR PRICES

S & S MACHINE WORKS

4533 W. LAKE STREET HARDWARE DIVISION CHICAGO, 24, ILLINOIS

**For
GUARDS
CABINETS
CASES
BOXES**

ordinary
able.
rehabili-
pressure

stuffed by
that have
pieces

pull-nose
the keep
mp over
secure-
e angles
accessible
re easily

ARDS
NETS
ES
ES

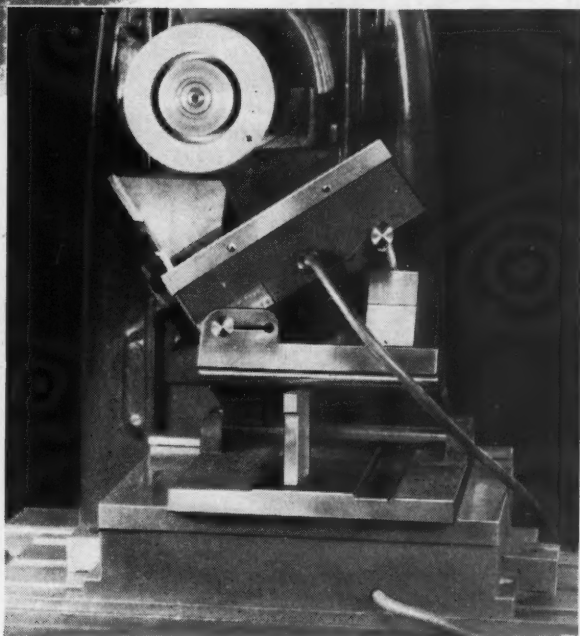
NOIS

uary, 1945

40 Seconds

**REQUIRED TO
MAKE THIS SET-UP**

**with
The
MAGNA
SINE**



That's all, just 40 seconds after he had read the angle on the print the machine operator had locked up the proper gage block in the Magna Sine Table of Constants and had placed the block in position. By simply placing the work on the table and turning the switch he is ready to grind. That is all there is to any angular set-up with the Magna Sine. To make a similar set-up with a sine bar and conventional methods would require at least 1 1/4 HOURS. And the Magna Sine set-up is more accurate and more secure than a set-up requiring the use of clamping devices.

The time saved by the use of the Magna Sine will more than offset its cost in a few days where an average amount of angular grinding work is done. Write today for full information on how you can increase the efficiency of your grinders and other machines requiring angular holding devices.

The Magna Sine is available in two sizes and two models. The Non-Magnetic Robbins Sine Plate of the same design and fine workmanship is also available.

ROBBINS ENGINEERING COMPANY
1818 MIDLAND AVENUE • DETROIT 3, MICHIGAN

In War, as in Peace...

CERRO ALLOYS

Save time and cut costs!

CERROMATRIX (Melting Temp. 250° F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, short run forming dies and other metal-working applications.

CERROBEND (Melting Temp. 158° F.) Used as a filler in bending thin-walled tubing to small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

CERROSAFE (Melting Temp. 190° F.) Used to accurately proof-cast cavities such as molds, gun chambers, forging dies, etc., and many similar applications.

REPRESENTATIVES AND DISTRIBUTORS

Brooklyn, N. Y., Belmont Smelting and Refining Works

Ansonia, Conn., Jackson Associates

Boston, Mass., Jackson Associates

Philadelphia, Pa., Castaloy Metal Sales Co.

Cleveland, Ohio, Die Supply Co.

Detroit, Mich., Castaloy Metal Sales Co.

Chicago, Ill., Sterling Products Co., Inc.

Moline, Ill., Sterling Products Co., Inc.

Milwaukee, Wis., Harry C. Kettleson, Inc.

Minneapolis, Minn., Northern Machinery & Supply Co.

St. Louis, Mo., Metal Goods Corporation

Kansas City, Mo., Metal Goods Corporation

New Orleans, La., Metal Goods Corporation

Dallas, Tex., Metal Goods Corporation

Houston, Tex., Metal Goods Corporation

Los Angeles, Calif., Castaloy Metal Sales Co.

Tulsa, Okla., Metal Goods Corporation

Montreal, Can., Dominion Merchants, Ltd.

London, Eng., Mining & Chem. Products, Ltd.

**Cerro De Pasco
Copper Corporation**

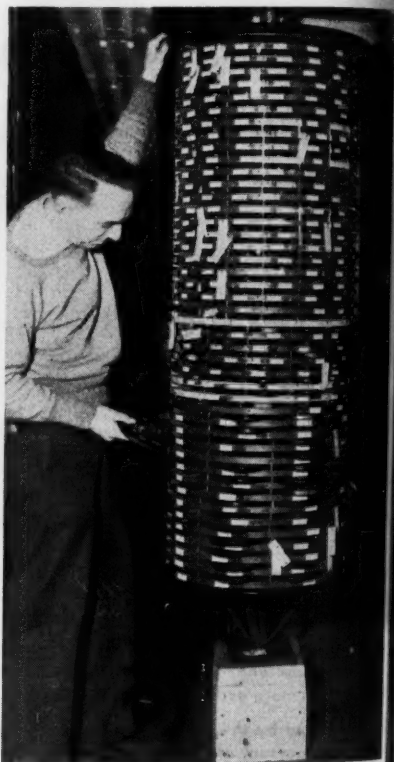
40 WALL ST.

NEW YORK 5, N. Y.

Turntable Gage Rack

(Courtesy General Electric Company)

AT the General Electric Company's Fort Edward plant some 400 snap gages are issued and returned daily, which means that the gages must be stored so that they will be



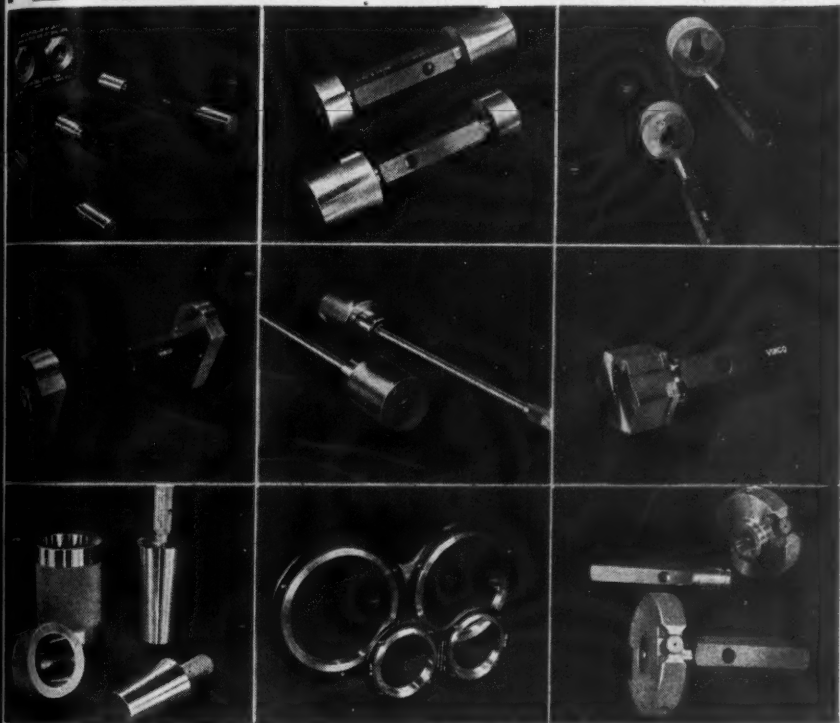
Turntable Snap Gage Rack

immediately accessible and at the same time take up a minimum of floor and wall space. The storage presented a problem until C. S. Loughlin of the plant's planning department devised the circular rack shown in the photograph.

The rack consists of a tier of cir-

PLAIN

GAGES—BUT OF VINCO QUALITY



Simplicity of design plus a great demand have encouraged many gage shops to bid for this type of gage work without having sufficient skill and knowledge to produce the perfection required for constant, accurate gaging. A plain cylindrical gage must not only be accurate but have a hard, durable surface, smooth enough to satisfy the microscopic scrutiny of the surface analyzer. To grind the plug blank down to the required size and

still maintain enough lap stock so the minute grind ridges can be lapped to this required smoothness involves a technique that is not learned overnight, a "know-how" that is developed only after long experience. That is the way WE make them—so if you are in the market for a plain cylindrical plug that is both durable and accurate, the best suggestion we can make is—Buy VINCO.

VINCO CORPORATION, 9861 SCHAEFER HIGHWAY, DETROIT 27, MICHIGAN. SALES OFFICES: NEW YORK, CHICAGO, CLEVELAND

MILLIONTHS OF AN INCH FOR SALE BY VINCO

Small Automatic Hydraulic Spline and Gear Grinder • Optical Master Inspection Dividing Head • Involute Checker • Angle Tangent to Radius Dresser • Index Plates • Precision Vises • Sine Bars • Straight-side Spline, Serration Spline, Involute Spline and Helical Spline Plug and Ring Gages • Thread Plug, Rings and Setting Plug Gages • Spur and Helical Master Gears • Muntzian Gages • Freepeller Hub Gages • Built-up and Special Gages • Gear Spline Fixtures • Spline and Index Fixtures • Hydraulic Power, Control, Utilization and Distribution Units • Engineering, Design and Development

January, 1945

MODERN MACHINE SHOP 213

lar wooden shelves mounted on a turntable, the shelves being spaced to accommodate the different thicknesses of the snap gages and with separators between the variously-sized gages. The separators also serve as spacers between the shelves. When a gage is removed from the rack, a tag is attached to that space in the rack.

The entire tier is mounted through the center on an iron pipe which rests

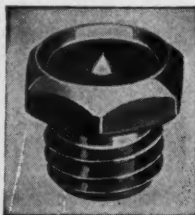
on a ball bearing at the bottom and runs through a roller bearing at the top. A pipe rail attached to the top and bottom shelves facilitates revolving the rack.

Simplifies Bore Concentricity Checks

(Courtesy General Electric Company)

A FIXTURE for testing concentricity of bores, devised by M. S. Anthony, general foreman at General Electric's Pittsfield Works, is simpler, more accurate, and 100 per cent faster than checking them on a lathe. The fixture consists essentially of a machined cast-iron block with a 1½ in. hole at one end to accommodate bushing to take various diameter adapters required for the bores. A

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

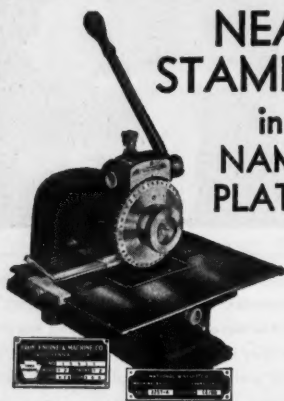


Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular.

**NIELSEN TOOL &
DIE COMPANY**

1960 W. Eleven Mile Rd.
Berkley, Mich.

NEAT STAMPING in NAME PLATES



Nameplate Detail Press

This machine quickly stamps details and serial numbers into name plates.

Write for Particulars

GEO. T. SCHMIDT, Inc.

1806 Belle Plaine Ave., Chicago 13, Ill.

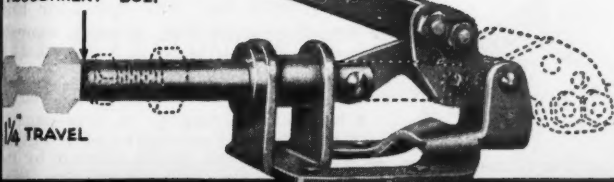


Operator fitting stud into bore to be checked

DE-STA-CO
Model 605

It's New!

TAPPED FOR
ADJUSTMENT BOLT



"PUSH AND PULL LOCK" CLAMP

Especially well suited for locating and indexing, fills a definite need on many jigs and fixtures. Work end (plunger rod) is tapped to receive standard bolt, which provides quick adjustment to suit the job at hand. Quickly converted from "push" to "pull" action or vice versa.

Bulletin No. 43 details this and many other labor saving De-Sta-Co toggle action clamps. Send for your copy.



DETROIT STAMPING CO.
Established Over 25 Years
349 Midland Ave • Detroit 3, Mich.

MODERN MACHINE SHOP 215



Checking concentricity of bore. Dial indicator on standard is alternative to using post in block.

$\frac{5}{8}$ -in. reamed hole at the other end of the block supports a post on which an indicator arm is clamped.

A hardened ground and lapped bushing pressed into the $\frac{1}{4}$ -in. hole provides a bearing support for the adapters. The bushing and adapters have a ground 30-degree seat to simplify alignment. Diameter of the adapters is held to within 0.0001 in. of the lower limit of their respective bores. To use the fixture, the operator either fits the part over the adapter, or the adapter into the part. Concentricity of the bore is checked easily by positioning the dial indicator and rotating the part.

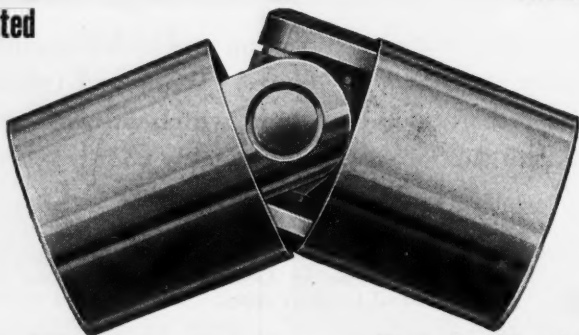
The previous method of checking the part on a mandrel between lathe centers with the dial indicator held in the tool post was always complicated by the tailstock.

Eddy Service Gages. A four-page illustrated folder descriptive of the Styles 22 and 23 service gages offered by the Eddy Mfg. Co., 321 Pine St., Pawtucket, R. I., is now available from this firm free upon request.

The ATLAS Precision Universal Joint

**Balanced
Heat-treated
Parts**

**Available from
Stock**



Made from Alloy Steels. All parts accurately ground. Can be supplied in Bronze. See our Vulcan Joint for rugged outdoor use.

**Write for Circulars
GRAY & PRIOR MACHINE CO.
600 WINDSOR STREET
HARTFORD 5, CONN.**

lapped
n. hole
for the
apters
to sim-
of the
0001 in.
pective
e oper-
ver the
he part
checked
indica-

checking
en lathe
tor held
compli-

-page il-
he Styles
d by the
t., Paw-
ole from

from
Stock

CO.

January, 1945



WILL GIVE YOU "AMPS"— Where and When You Need Them

The outstanding performance of the Udylite-Mallory Rectoplater needs no introduction to all those who use this flexible, economical source of plating "Amps." There are over five million "Amps" already in constant operation.

The NEW Rectoplater combines all the advantages of the original Rectoplater (standardized design, flexibility of use, low cost, etc.), plus many new features which make it absolutely the finest source of current for all types of plating to be found anywhere.

UDYLITE engineers have developed a better, more efficient system of "directed cooling"—a more rigid, vertical fan mount—greatly increased rectifier junction area—stepped up amperage output. They have installed an easy, positive lubrication system—top exhaust ventilation with new type baffling which saves valuable floor space—improved and strengthened construction. All without additional cost.

The NEW Rectoplater has greater efficiency, longer life, better performance, and still greater dependability. It's just what you have been looking for.

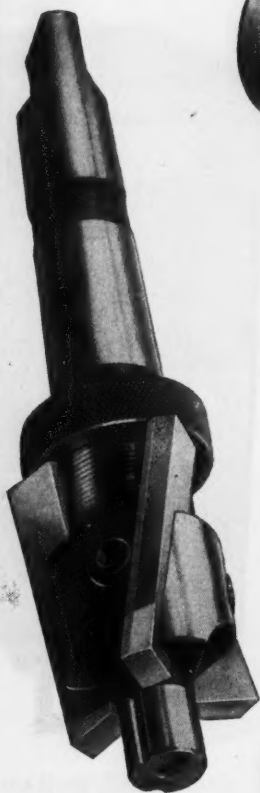


THE UDYLITE CORPORATION

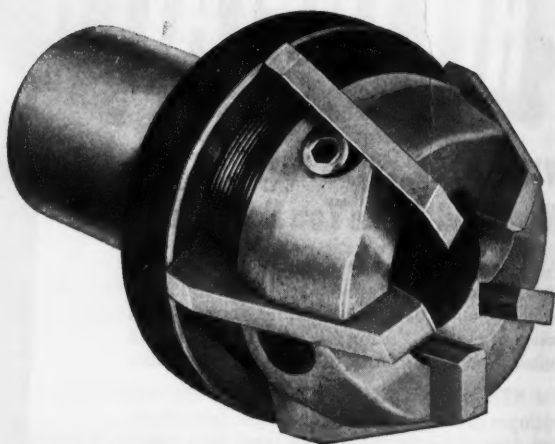
1651 EAST GRAND BOULEVARD • DETROIT 11, MICHIGAN
REPRESENTATIVES IN ALL PRINCIPAL CITIES

GENESEE

ADJUSTABLE HOLLOW MILLS



**Style H Facing and
Counterboring Tool**



Cut Cost—Increase Production

with GENESEE inserted blade—

**ADJUSTABLE HOLLOW MILLS
FACING and COUNTERBORING TOOLS
SPECIAL PRODUCTION TOOLS**

Backed by 35 years experience our Engineering Department is always ready to serve you in your Production Tool problems.

Write for complete Catalog No. 44-G

GENESEE MFG. CO.
ROCHESTER 4, NEW YORK

LE

If you're fishing for specials
drop a line to Apex!

What it takes to build Socket Wrenches—
we have. Hex or square... standard or special
nut... power or hand driven... it's all the
same to Apex. We're tooled up for speed and
flexibility.

Some very unusual nut running problems
have been put up to us. For most of these we
have been able to design and build special

sockets and wrenches that solve these very
unusual problems.

Drop us a line! We can probably be of
assistance to you.

Apex also makes Safety Friction Tapping Chucks,
Quick Change and Positive Drive Drill Chucks,
Vertical Float Tapping Chucks, Parallel Floating
Tool Holders, Power Bits for Phillips, Slotted Head
and Clutch Head Screws, Hand Drivers for Phillips
and Clutch Head Screws, Aircraft and Commercial
Universal Joints.

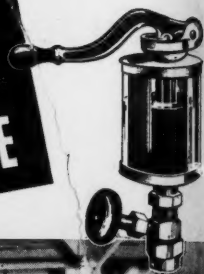
APEX

Socket
Wrenches

THE APEX MACHINE & TOOL COMPANY • DAYTON 2, OHIO



BETTER LUBRICATION *means* BETTER MAINTENANCE



If you are experiencing difficult maintenance, better check lubrication. It may be inadequate with resultant excessive wear.

Sinclair offers better lubrication for better maintenance of MACHINING equipment with specialized hydraulic,

spindle, gear and general purpose oils ... also highly efficient cutting oils and coolants for all machining operations, speeds, and metals.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N.Y.

Abrasive G-P DIAMOND TOOL KIT

ABRASIVE DRESSING TOOL CO.
DETROIT, MICHIGAN
12401 DETROIT, MICHIGAN

AT LONG LAST!

Diamond Tools for every purpose in a
HANDY, THRIFTY KIT!

**10 TOOLS
2 HOLDERS
2 KEYS**

Complete in Handy Kit

only \$ **49.50**

Each Kit with
REGISTERED GUARANTEE

Here's What You Get!

- ① 1 Abrasive diamond tool with 2.5 carats of diamonds for straight dressing wheels up to 20" x 1 1/2"
- ① 1 Abrasive diamond tool with .30 carats of diamonds for straight or form dressing up to 12" x 1"
- ① 1 Abrasive diamond tool with .60 carats of diamonds for straight or form dressing up to 20" x 2"
- ① Abrasive chisel-type diamond tool for all sizes of radii.
- ① 1 Abrasive Red Band with diamond at 65° included angle for 0.020 radius and larger.
- ① 1 Abrasive Red Band with diamond at 85° included angle for 0.025 radius and larger.
- ③ 3 Abrasive Phonopoints for 0.015 radius and larger.
- ① Abrasive Diamond Scriber.
- ② Abrasive Tool Holders.
- ② Sturdy Keys.

Important: If your supply house has not yet stocked this G-P Kit, have them place your order . . . or place your own order direct for **IMMEDIATE DELIVERY!**

DISTRIBUTOR TERRITORIES OPEN—WRITE FOR DETAILS!

THIRD GENERATION OF DIAMOND EXPERIENCE

HERE'S YOUR CHANCE to get a matchless assortment of dressing tools, radius tools, cutting tools, phonopoints, a scriber and a pair of sturdy, hand tool-holders—a kit that meets practically **ALL** shop requirements—at a saving that speaks for itself!

And remember, you get *quality* tools, backed by three generations of diamond experience. The **Abrasive RED BAND** of proven performance assures you *better* work, *more* work per set-up. Each kit is numbered for your protection. Place your order **TODAY!**

**Abrasive
DRESSING TOOL COMPANY**
Detroit, Michigan

News of the Industry

Auto Builder Predicts Ten-Billion-Dollar Years

A prediction that the automobile dealers of America will enjoy a series of "ten-billion-dollar years" after the war has been made by Joseph W. Frazier, Chairman of Graham-Paige Motors Corporation. Frazier said "It is estimated that there are approximately 6,500,000 one-time car-owners in America without automobiles and 1,000,000 former truck users without trucks. In addition, there are 8,000,000 drivers who are about ready to junk their cars, since they are more than 7½ years old. Therefore there will be an immediate market for 15,000,000 automobiles and trucks in this country as soon as the industry can produce them. The tremendous demand for new motor vehicles is supported by the savings backlog of more than \$100,000,000 now in the hands of consumers."

Clayborne Distributors, Ltd. to Form Export Pool

Plans to organize a selling pool among small manufacturers who wish to participate in foreign trade have been announced by Norman F. Clayborne, President of Clayborne Distributors, Ltd., 209 S. LaSalle St., Chicago, Ill. This development is being encouraged by the government as a partial solution to the surplus war goods problem.

Interested manufacturers are invited to contact Mr. Clayborne so that definite steps can be taken for consolidated export sales just as soon as conditions abroad will permit.

Product Designers

A new organization of industrial designers and engineers has recently been formed in Chicago with offices at 230 North Michigan Avenue, according to an announcement by W. C. Nichols and Joseph Palma, Jr., principals of the

firm. Operating under the firm name of Product Designers, this organization offers a complete service including idea development, design, engineering, tooling and packaging.

Both Mr. Nichols and Mr. Palma are well-known in the industrial design field, having formerly been associated as Nichols and Palma, industrial design associates.

Sheffield Contract Service

A very helpful contract service is now being offered to manufacturing plants engaged in the problems of tooling for new or improved products by The Sheffield Corp., Dayton 1, Ohio. The service includes the designing and manufacturing of tools, dies, jigs and fixtures, and special purpose machine tools, and the precision manufacture of threaded and formed ground components as well as sub and complete assemblies.

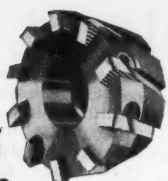
Surplus Materials

The first edition of the Treasury's "Surplus Reporter" was issued on November 29th, and two more editions will be issued every ten days until all of the eight commodity divisions of Treasury's Office of Surplus Property have been covered. The eight divisions are: Furniture, Hardware, Machinery, Automotive, Textiles and Wearing Apparel, Medical and Surgical, Paper and Office Supplies, and General Products.

The "Surplus Reporter" is to be issued from each regional office at regular intervals. The Reporter will advise the firms on the Treasury's mailing list what the Treasury has to sell, the area in which the material is located, and the general method which will be used to sell it. It will be unnecessary for prospective purchasers to contact each of the eleven regions around the country to determine what surpluses are available.

Purchasers will contact the regional

McCrosky

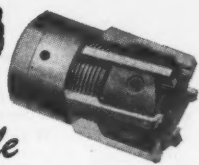


Jack-Lock
MILLING CUTTERS

Face, Half-Side, and Staggered Tooth Milling Cutters featuring McCrosky's exclusive, nationally recognized Jack-Lock wedge that holds the blades rigidly and solidly yet permits easy, quick release for adjustment, regrinding or replacement. Send for Bull. 16-M.

McCrosky

Super Adjustable
REAMERS



Chuck or shell types. Straight or spiral mounted blades are held rigidly with McCrosky's time-tested shop-proved pin and screw locking device, assuring easy and uniform adjustment,—and regrinding with minimum loss of blade stock. Send for Bull. 16-A.

Cut your costs with
McCrosky TOOLS

McCrosky

Block Type
BORING BARS...

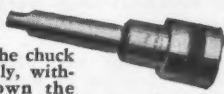
Featuring McCrosky's exclusive, patented centralizing V-lock that centers and holds the cutter blocks accurately and rigidly, yet permits the operator to change the block easily, and to "float" with extreme accuracy the block used in making finish cuts. Send for Bulletin 16-B.



McCrosky

Wizard
CHUCKS AND COLLETS

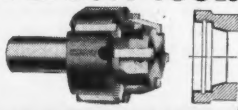
... permit the collets to be latched and centered rigidly in the chuck and released easily, without slowing down the spindle, thus making multiple tool jobs continuous, and permitting machine tapping, at high speed, on drill press or lathe without danger of tap breakage. Send for Bull. 16-D.



McCrosky

Special
MULTIPLE DUTY TOOLS

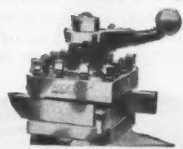
... combine related facing, boring, counterboring and reaming operations, permitting 3, 4, 5 or more operations to be done simultaneously with just one tool, speeding up production, and cutting costs. Each tool engineered to the individual job. Suited for long or short runs. Send for Bulletin 17-S.



McCrosky

Turret
TOOL POSTS...

Mounted on the T-slot of the compound rest, or bolted on the main slide, McCrosky turrets enable the operator to handle successive operations without stopping for tool changes,—give engine lathes the versatility of turret lathes. Square and hexagon designs. Send for Bulletin 16-E.



McCrosky TOOL CORPORATION
MEADVILLE, PA.

COST CUTTING TOOLS

Designers and Manufacturers of
Jack-Lock MILLING CUTTERS
Block Type BORING BARS
Wizard CHUCKS AND COLLETS
Super Adjustable REAMERS
Turret TOOL POSTS

office and indicate the items in which they are interested. A list of regional offices can be obtained from the Office of Surplus Property Division, Treasury Department, Washington 25, D. C.

DoALL Trade School Expands

The DoALL Trade School has moved from its former location in Minneapolis to new and larger quarters in Des Plaines, Illinois. The DoALL Company, sponsor of the school, realizing the importance of short-cut and material-saving methods in postwar production competition, has arranged to incorporate the company's customer test and research laboratories in the school's training program.

At its new location, the school is housed in a large, modern plant and, in addition to instruction covering the operation, application, and maintenance of DoALL equipment, trainees also receive valuable first-hand test data and set-up experience even before this information is released to the field. With over 74 per cent of the total training time spent in practical shop work, the course has also been cut to a four-week training period.

Applicants are picked according to past schooling or experience. Company-sponsored men are enrolled upon the sponsoring firm's request. Class schedules and general information can be obtained by writing to the Director, DoALL Trade School, 254 N. Laurel Ave., Des Plaines, Illinois.

New Distributor Setup

Mixing Equipment Co., Inc., Rochester, N. Y., manufacturer of "Lightnin" portable mixers and heavy duty "Mix-

co" agitators, announces changes in its sales organization.

The Emerson Scheuring Tank & Manufacturing Company of Indianapolis, Ind., will act as representative for Central Indiana. The White Industrial Sales & Equipment Company of Cincinnati, Ohio, will represent the company for Southern Ohio, Northern Kentucky, and the Western part of West Virginia, including Charleston. The portion of the West Virginia territory was formerly handled by the Moorhead Co., Pittsburgh, Pa., and the New York City office of the Mixing Equipment Company.

New Colonial Tool Heat-Treating Plant

Colonial Tool Co., Ltd., in its new plant at 1691 Walker Rd., Windsor, Ontario, Canada, now has in operation a very complete and modern commercial heat-treating department. The company, which produces a complete line of both high speed steel and carbide cutting tools, operates some 22 furnaces and baths for heat treating, carburizing, and cyaniding.

In addition to heat-treating equipment proper, the department is provided with sand blast equipment for cleaning new or finished work, hardness testing machines, straightening presses, and so on.

Whitman & Barnes Carbide-Tipped Tools. Whitman & Barnes, 2108 W. Fort St., Detroit 16, Mich., has issued a four-page circular containing complete tabular information on taper and straight shank carbide-tipped chucking reamers. Copy free upon request.



Actual Size Photo
3 Carat Size—Common
1 1/2" Shank—\$36.00 ea.

LOC-KEY-SET
by Patented Process
U. S. Pat. 2,351,741

16
Factory Branches
Jobbers
Everywhere

DIAMONDS for Production

RE-SET-ABLE • BIG-HED-NIB
(Trade Marks Registered)

Equip Now with
"RE-SET-ABLE"
Diamond Tools
on Your
Precision Grinding
Production Line



● **RE-SET-ABLE** adds to life of your diamond
... More work per carat. Exclusive patented setting is tender to the diamond ...
... Holds firmly ... Protects from damage ...
... Guards against breakage.
No. 24 CN RE-SET-ABLES are now selling in 100 lots. Ask for easy No. 4 Catalog and Grinder's Instruction Card. Shows sizes to fit your machines. Tools backed by service unequalled.

All diamonds are **LOC-KEY-SET** for immediate shipment ... Tools numbered in units of 1/2 carat (No. 1 size) and lettered to denote quality of diamond and style of mounting ... 3 grades—Common (C), Medium (M), Select (S). 24-hour resetting service \$1.00 postpaid. Bigger stones in C grade are genuine economy in diamond use. For large wheels we recommend No. 60-CN.

SHELDON M. BOOTH, Pres.
938 E. 41st Street CHICAGO 15, Ill.

MEASURING in MILLIONTHS

... for three generations

IN SWEDEN, before the turn of the century, Hjalmar Ellstrom, father of Elmer Ellstrom, the present head of the Dearborn Gage Company, built the first known gage blocks to accuracies of millionths of an inch.

That same Ellstrom was the production genius of the first company ever to sell master gage blocks commercially.

Today, his son and grandsons are carrying on in his footsteps by making gage blocks for industry throughout the world. In fact, they were the only ones to make a major improvement on Hjalmar Ellstrom's original gage block by successfully chromium plating the gaging surfaces of their blocks to increase their wearing qualities.

Yes, in three generations, craftsmanship in millionths of an inch has become a tradition with the Ellstrom family. This has prompted the writing of a booklet entitled, "The Saga of Ellstrom". It tells the complete story of the development of the gage block. Your copy will be sent you upon request, just write the Dearborn Gage Company, 22038 Beech Street, Dearborn, Michigan.



HJALMAR ELLSTROM



ELMER ELLSTROM



OLOF ELLSTROM

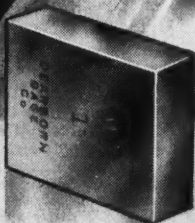
Ellstrom
3 GENERATIONS of GAGE MAKERS



ELMER ELLSTROM II



RALPH ELLSTROM



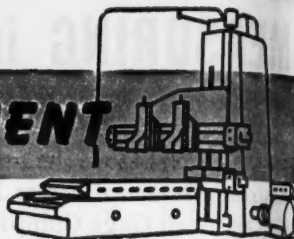
DEARBORN GAGE CO.

22038 Beech St.

Dearborn, Michigan

*Originators of Chromium Plated
Gage Blocks*

NEW SHOP EQUIPMENT



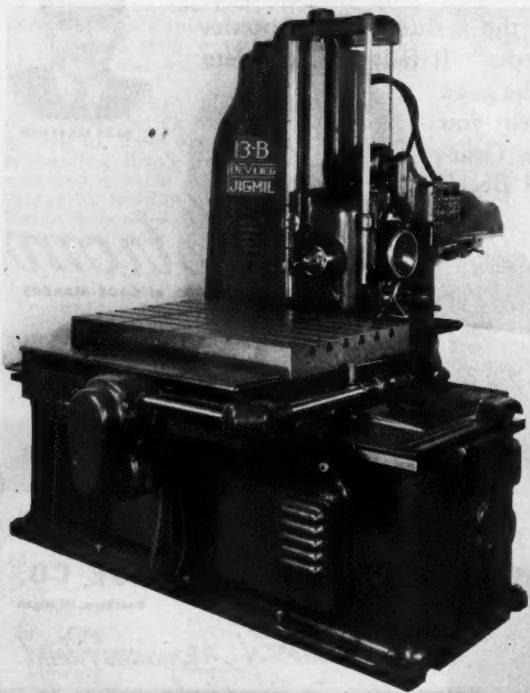
DeVlieg Model 3-B 3-Inch Bar "Jigmill"

Introduction of the DeVlieg Model 3-B 3-Inch Bar "Jigmill" shown in the accompanying illustration is announced by the DeVlieg Machine Co., Ferndale, Mich. The machine includes a feature which makes it possible to automatically position the spindle and table from one location to another accurately to

within 0.0001 inch. Another feature comprises a new type of feather touch controlled pressure locking means that firmly locks the slides with controlled uniformity. This effects the uniform treatment of the oil films and prevents errors of manual locking, it is claimed.

Retraction of the table and work from the cutting position is obtained by means of push button control, which provides for unlocking of the table, retraction the desired distance from the cutting position, and automatic return. The finger-tip control renders all functions of the machine operative from one position and is mounted on the spindle head where it has the advantage of traveling with the head and the operator for maximum convenience. The spindle is of heavy construction, and all gears are finish shaved for quiet, smooth operation.

The machine includes a total of five motors; namely, a $3\frac{3}{4}$ -7½ h. p., 900-1800 r. p. m., two-speed motor for the spindle head drive; 1 h. p., 1200 r. p. m. motor for the rapid traverse movement to the head and table; ½ h. p., 400-1200 r. p. m., two-speed motor for the milling power feeds to the head and table; ¼ h. p.,



DeVlieg Model 3-B 3-Inch Bar "Jigmill"

1200 r. p. m. motor for the automatic retraction for repositioning and locking function of the table; and 1/3 h. p., 1200 r. p. m. motor for the rapid traverse movement of the bar. All motor mountings are readily accessible.

The DeVlieg Model 3-B 3-Inch Bar Nismill has 24 spindle speeds ranging from 22 to 1200 r. p. m. Bar feeds are in thousandths per revolution from 0.001 to 0.016 inch. Milling feeds to the table and the head are in inches per minute and are selected with a dial quick-change mechanism providing a range from 0.3 to 15 inches per minute.

The table is 30 x 48 inches in size and has a horizontal movement of 48 inches and vertical movement of 37 inches starting with a center 1 inch below the top of the table and extending to 36 inches above the top of the table. The bar has a movement of 16 inches, with an extra means provided for resetting 6 additional inches. The retraction movement of the table is 16 inches.

The machine is equipped throughout with anti-friction bearings and automatic lubrication, and weighs 20,000 pounds.

Fulmer Hydraulic Piston Ring Lapper

Said to greatly simplify aircraft engine overhauling, the Fulmer Hydraulic Piston Ring Lapper illustrated herewith has been brought out by the C. Allen Fulmer Co., 1217 First National Bank Bldg., Cincinnati, Ohio. Simple in operation and easily adjusted, the machine is designed to handle cylinders of all diameters encountered in aircraft engine servicing.

By using the Fulmer Hydraulic Piston Ring Lapper, many hours of "run-in" time for new or overhauling engines can be saved, it is claimed. From 10 to 25 strokes of the machine are all that are normally required to lap a conventional set of rings, the manufacturer states.

The Fulmer Piston Ring Lapper is designed to lap full sets of rings into cylinder barrels up to a maximum bore of 6 3/4 inches. Units to handle bores greater than 6 3/4 inches can be supplied on special order.

The machine is constructed to afford a half revolution of the spindle on a full outstroke, with no rotation on the return stroke. At each reciprocating cycle,

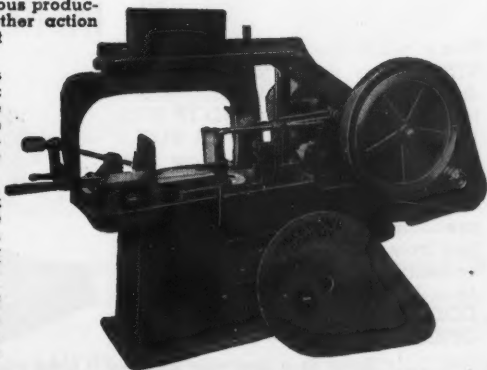
ROBERTSON'S ECONOMY SPEED HACK SAWS

The No. 4X Type Robertson ECONOMY Saw is especially suited for heavy, continuous production metal cutting and gives smoother action and faster cutting. Other salient features include—

- Bronze brushed journal bearings
- Standard stroke of 6" • Automatic stop
- Gravity feed with adjustable pressure blocks
- Hydraulic lift on back stroke
- Standardized construction
- Accessibility to all parts
- Few adjustments.

Robertson ECONOMY Power Hack Saws are in use throughout the world—more than 30,000 have been installed. Make your next power hack saw a Robertson ECONOMY for speed and accuracy.

Robertson builds a complete line of Power Hack Saws in sizes and types to suit your needs. Send for illustrated folder Form 1-A which gives complete details.

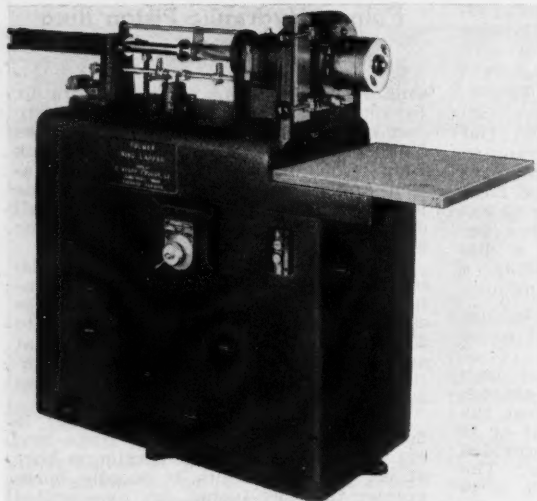


W. ROBERTSON

MACHINE & FOUNDRY CO., INC.

52 RANG ST.

BUFFALO 7, N. Y.



Fulmer Hydraulic Piston Ring Lapper

operates in a bath of oil and includes a wiper seal to protect it against dirt and grit. The spindle can be set to provide working strokes in steps from 2 to 12 inches. A reset counter provided on the machine informs the operator of the number of strokes for each operation.

The Fulmer Hydraulic Piston Ring Lapper is equipped with a Vickers hydraulic pump and valves, the pump being driven by a 2 h.p. motor. The tank, motor, and valves are incorporated in the base of the machine, with ample room provided for getting at any part of the equipment. Adaptor

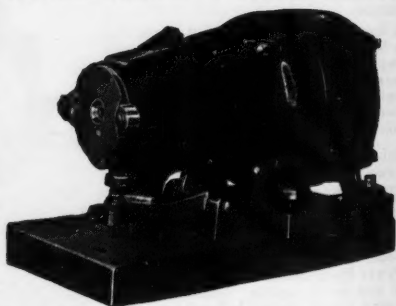
plates for holding any size cylinder can be supplied. Cylinders are locked in position by means of quick-action clamps. Steel lapping heads which do not require

the spindle "hunts" so that there is no possibility of the abrasive traveling over the same path during the next stroke of the lapping operation. The spindle

SAVES TIME — SAVES MANPOWER and INCREASES Production!

That's what the PRECISION WIRE STRIPPER is doing today for hundreds of war production plants throughout the U. S.—AND IT WILL DO THE SAME THING FOR YOU if wire stripping problems now confront you.

In a twinkling, this ruggedly built precision instrument removes insulation from the ends of solid, stranded or multi-conductor cable and wire up to a half inch in diameter AND IT DOESN'T REQUIRE A SKILLED OPERATOR.



Drop us a line now and we'll send you complete details on THE PERFECTION WIRE STRIPPER by return mail.

WEBER MACHINE CORPORATION

59 Rutter St.

Rochester 6, New York

n Ring

oil and
to pro-
nd grit.
set to
okes in
ches. A
ded on
ms the
nber of
eration.
ydraulic
per m
ters hy-
valves.
en by a
nk, mo-
ncorpo-
the ma-
om pro-
ny part
Adaptor
der can
in posi-
clamps.
require

on!

N
York

January, 1945



The mark of a GOOD File

FORD—ace high in the field for twenty-five years—America's oldest manufacturer of rotary files—producer of the COMPLETE line. Write for catalog today.

M. A. FORD MFG. CO., INC.

744 W. First Street • Davenport, Iowa

HAND CUT FILES • GROUND FROM SOLID CUTTERS • CARBIDE CUTTERS

January, 1945

MODERN MACHINE SHOP 229

Micro *Supreme* LAY-OUT AND IDENTIFICATION DYE

IN
12
COLORS

Red
Blue
Green
Brown
Black
Purple
Cerise
Yellow
Violet
Tangerine
Chartreuse
Aquamarine

Used for Both
★ TOOL, DIE, PATTERN
OR TEMPLATE LAYOUT
ON METAL.
★ QUICK IDENTIFICATION OF
BAR STOCK, SHEET OR STRIPS,
TOOLS, DIES OR PARTS.

DRIES INSTANTLY
QUICKLY, EASILY REMOVED

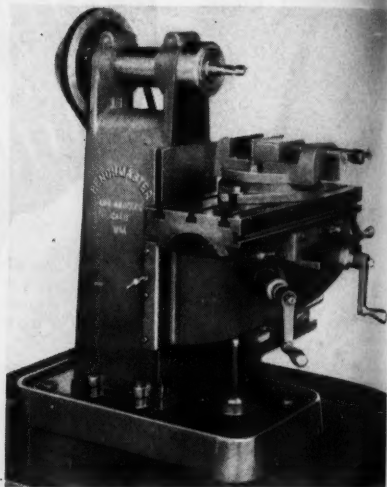
Circular giving full information and prices
sent upon request.

**MICHIGAN CHROME &
CHEMICAL COMPANY**
6354 E. Jefferson Ave. • Detroit 7, Mich.

the rings to be opened in putting them on or taking them off the heads can also be furnished.

Benchmaster Improved Bench Milling Machine

An improved bench milling machine for vertical or horizontal milling is announced by the Benchmaster Manufacturing Co., 2952 W. Pico Blvd., Los



Benchmaster Improved Bench Milling Machine

Angeles 6, Calif. The machine can be quickly and easily converted from a vertical to a horizontal miller with overarm and arbor by simply interchanging the spindle attachments. In either arrangement, the machine is said to be equally adapted to precision tool work or high speed production by equipping it with a rack and pinion feed in place of the hand feed.

According to the manufacturer, the improved miller is more streamlined, heavier, and more accurate than previous models. Other features include ball thrust bearings on the vertical lead screw; gib locks on the table, saddle, and knee for ensuring accuracy once the machine is set up; and evenly distributed weight.

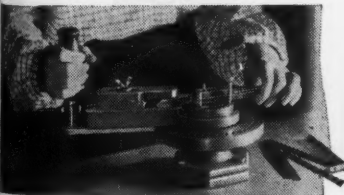
The horizontal miller includes an overarm attachment for outboard support of the end of the arbor in taking heavy cuts or for slitting operations.

Talk About PRODUCTION Without DIES!

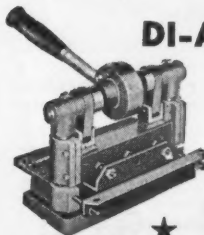
4,000 PARTS per DAY with DI-ACRO Bender

"Enclosed pictures in our plant prove that the DI-ACRO Bender will do a real production job. We are making 4,000 completed parts per day which is competitive to most Power Presses." (Name on Request.)

Here is an example of "DIE-LESS DUPLICATING" typical of a great variety of formed parts readily made with DI-ACRO Precision Machines, — Benders, Brakes, Shears. Picture below shows the DI-ACRO Bender making an acute right angle bend and photograph above shows the finished part formed to die precision. Women operating DI-ACRO units maintain a high out-put on production work.



DI-ACRO IS PRONOUNCED "DIE-ACK-RO"

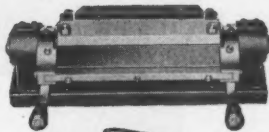


DI-ACRO Shear

Squares and sizes material, cuts strips, makes slits or notches, trims duplicated stampings. 3 sizes. Shearing widths, 6", 9", 12".

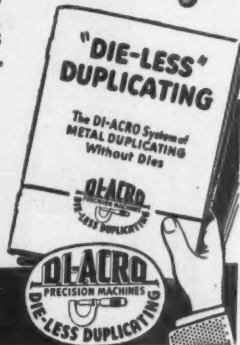
DI-ACRO Brake

Forms non-stock angles, channels or "Vees". Right or left hand operation. 3 sizes. Folding widths, 6", 12", 18".



Send for Catalog

showing DI-ACRO Precision Machines and many examples of parts made with "DIE-LESS DUPLICATING".



O'NEIL-IRWIN mfg. co.

306 EIGHTH AVE. SOUTH • MINNEAPOLIS 15, MINNESOTA

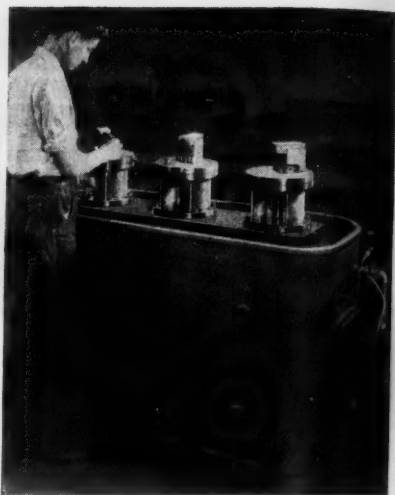
MODERN MACHINE SHOP 231

The vertical mill attachment features a spindle arm which can be swung 60 deg. either side of center and is graduated in degrees.

The Benchmaster Improved Bench Milling Machine measures 28 inches high with either vertical or horizontal spindle attachments in place. Additional specifications of the machine are as follows: standard table size 6 x 14 inches; special table size, 6 x 18 inches; longitudinal travel of standard table, 8½ inches; longitudinal travel of special table, 12½ inches; transverse travel of table, 5½ inches; vertical travel of table, 8½ inches on the vertical mill and 9½ inches on the horizontal mill; spindle, No. 2 Morse taper; standard arbor, ⅞ inches in diameter; special arbor, 1 inch in diameter; motor, 1/3 h. p.; weight 215 pounds.

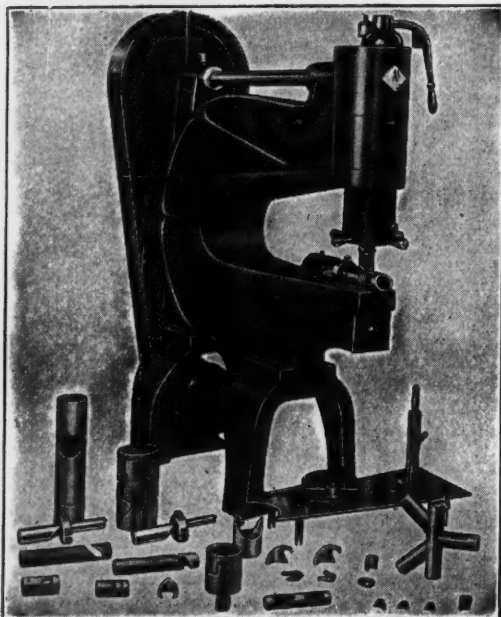
Prutton Tapmaster Tapping Machine

Designed to tap three different size holes up to 1 inch simultaneously, a three-spindle automatic tapping machine to be known as the Prutton Tapmaster



Prutton Tapmaster Tapping Machine

is now being manufactured by the D. H. Prutton Machinery and Tool Co., 5235 W. 130th St., Cleveland 11, Ohio. Up



For **FAST** and **SAFE** cutting of sheet metal, duplicating parts, and to relieve other machine tools, investigate the

SAVAGE NIBBLING MACHINE

TUBE SLOTTING AND TUBE SHAPING
For cutting flat sheets by template or to a scribed line.

Cutting Capacities

Flat Sheets Mild Steel ¾"
Tough Alloys ⅝"

Tubing

Wall thickness to ⅜"
1" I.D. to 36" O.D.

The Fastest Method of Tube Slotting and Shaping by Guide Template.

Ask for BULLETIN "H"

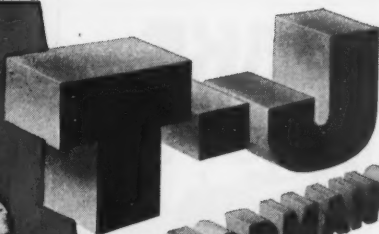
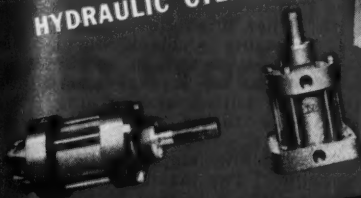
Manufactured by

W. J. SAVAGE COMPANY

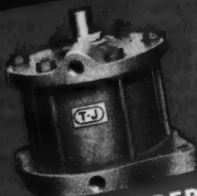
Since 1885

KNOXVILLE TENNESSEE
Pioneer Manufacturers of Nibbling Machines

HYDRAULIC CYLINDERS



**PERFORMANCE
UPS PRODUCTION
CUTS COSTS!**



AIR CYLINDERS

DIE SINKING MILLING CUTTERS



AIR CONTROLS



● T-J Products have shown outstanding ability to "take it" ... performing tough jobs for industry with unbeatable *accuracy*, *efficiency* and *dependability*!

That's why more and more practical production men *specify* T-J where there's a job for Rivitors ... hydraulic cylinders ... or air cylinders ... cutters ... Clinchers ... or air controls. All T-J Products expertly engineered ... precision-built ... rigidly inspected ... right in every respect! Send for latest bulletins. The Tomkins-Johnson Company, Jackson, Michigan.

CLINCHORS

RIVITORS



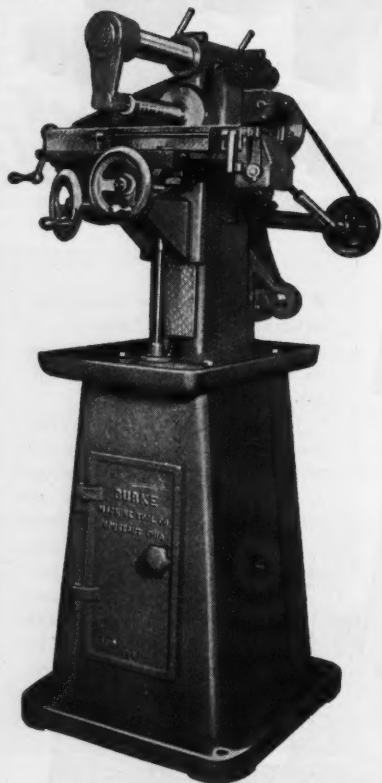
TOMKINS-JOHNSON

RIVITORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

January, 1945

MODERN MACHINE SHOP 233

BURKE MILLING MACHINES



No. 4 Motor Driven MILLING MACHINE
Mounted on Cabinet Column

Burke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

BURKE MACHINE TOOL CO.
297 E. 16th St. Connaut, Ohio

to three different sizes of work can be handled at the same time on the machine, which is provided with three separate motors having separate controls. The Prutton Tapmaster can be operated with either a single or continuous cycle. Pressing a black button marked "A" causes the spindle to travel all the way to the top and reverse. Pressing the same button and turning it causes the cycle to be repeated again and again.

The machine employs the lead screw principle. The master nut has a safety feature which is said to prevent excessive vertical pressure on the tap. A keyway in the inside wall of the lead screw fits a key in the spindle. Positive feed by the lead screw is said to prevent any tearing of the threads. The total lead is held within a tolerance of 0.0005 inch, it is claimed.

The Prutton Tapmaster is designed to tap a hole up to 1½ inches in length with a range in pitch up to 8. The machine is provided with two tanks of 5-gallon capacity, one for coolant and the other for hydraulic oil in the event that hydraulic holding is desired. All working parts of the machine are readily accessible through removable cover plates.

The Prutton Tapmaster Tapping Machine is 60 inches long x 22 inches wide x 34 inches high, and is equipped with three 2 h. p. a. c. motors. The shipping weight of the machine is approximately 2000 pounds.

Anderson Armature Straightening Press

A high-speed armature straightening press of 20-ton capacity is now being introduced by Anderson Bros. Mfg. Co., 1926 Kishwaukee St., Rockford, Ill. The press, which is 65 inches long overall, is designed to accommodate armatures up to 14 inches in diameter and is powered by means of a hand hydraulic pump. The machine can also be furnished with a power hydraulic unit.

Three or more indicators are employed to check the straightness of the armature shafts at vital points. The indicators are attached to one pivot shaft and are all swung into and out of position with one movement of the hand. The spring-mounted centers are located on a V-slide to prevent tipping, particularly when centering unusually heavy armatures.

The ram of the press is of the travel-

Behind the eight ball with Production Problems

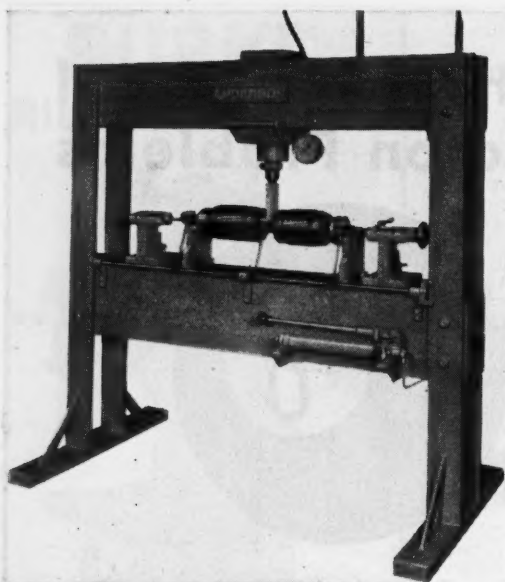


Because "eight balls" loom large in front of every production man at times . . . SYNCRO has developed a specialized service to remove such obstacles. SYNCRO specializes in tough engineering-production problems and in the manufacture of precision machined tool products for Victory and after Victory. Consult SYNCRO now—without obligation.

SYNCRO DEVICES, INC.
FERNDAL 20, MICHIGAN

SYNCRO

Manufacturers of Precision Machined Products



Anderson Armature Straightening Press

ing type and operates on four prelubricated ball bearings. The hydraulic gage is mounted directly on the ram in line with operators' eye for quick reading.

Eisler Portable Air-Operated Gun Welder

Designed to facilitate the welding of hard-to-get-at areas, the portable air-operated adjustable gun welder shown herewith has been brought out by the Eisler Engineering Co., 740 S. 13th St., Newark 3, N. J. To use the

welder, the operator simply connects it to the proper air, water, and power lines.

Direct air operated, the Eisler Gun Welder is equipped with a double-acting air cylinder and the necessary operating mechanism—fully or semi-automatic, depending on the choice of control. The power unit consists of an air-cooled transformer with an 8-tap switch for heat regulation (7 "on" and 1 "off"); a pneumatically or electronically actuated timer; and a high speed mechanical or electronic contactor for accurately timing the weld in speed or automatic repeat of strokes. The welding cycle can be initiated by a foot switch or push button. The air system includes solenoid operated air valves, air filter, pressure regulator, gage and switch, and air-line oiler.

The base separating and isolating the holding arms is a rugged bronze casting, and the sturdy horns are made from hard drawn copper. Flexible copper braids carry the power current to the movable electrode. The water-cooled tapered welding tips are made of a special high conductive heat and wear-resisting alloy and can be readily interchanged. The welding gun is free swinging and is attached to a beam which is counter-balanced against the transformer. The gun can be mounted horizontally or vertically or, if necessary, fixed on a low base.

HYBCO GRINDING HEADS

For Universal Tool and Cutter Grinders.

CHAMFER SHARPENING HEAD

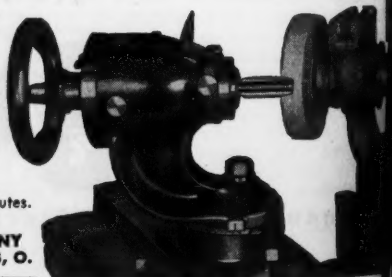
Accurately Relieves Chamfers of TAPS—STEP DRILLS—CORE DRILLS—COUNTERSINKS—similar tools with evenly spaced flutes.



FLUTE SHARPENING HEAD

Sharpens Straight or Angular Flutes—GUN OR SPIRAL POINTS OF TAPS—Other tools with evenly spaced flutes. Write for Circular GH

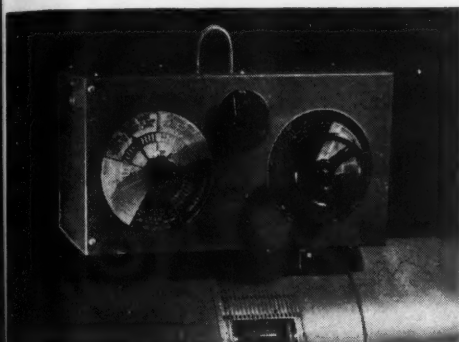
HENRY P. BOGGIS & COMPANY
1279 W. 3rd St., Cleveland 13, O.



"SITTING TIGHT," *he says*

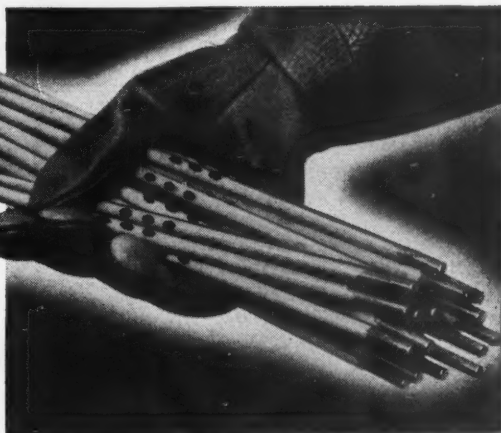
Look, Francisco . . . here is the wherewithal to step out in front with Arc Welding:

THE TOOLS FOR NON-STANDPATTERS



"SHIELD-ARC" WELDER

The "Job Selector" of the Lincoln "Shield-Arc" Welder permits selection of the TYPE of welding arc . . . a predetermined welding characteristic . . . to match the job. Its Current Control provides any desired amperage over a wide range. Both selectors are Self-Indicating for KNOWN results . . . unmatched speed, ease and economy of welding. The "Shield-Arc" is recognized the world over for its superiority 32 ways . . . described fully in Bul. 412.



"FLEETWELD" ELECTRODES

These world favorites have been copied extensively as to general appearance and color of coating. To enable you to KNOW that you get the genuine "Fleetweld," they now are marked with 3 GREEN DOTS. Look for this sign of Lincoln Electrodes . . . recognized the world over for their superiority in quality and economy. Complete details and welding procedures in the "Weldirectory," Bul. 402.

THE LINCOLN ELECTRIC COMPANY • CLEVELAND 1, OHIO

America's greatest natural recourse
ARC WELDING

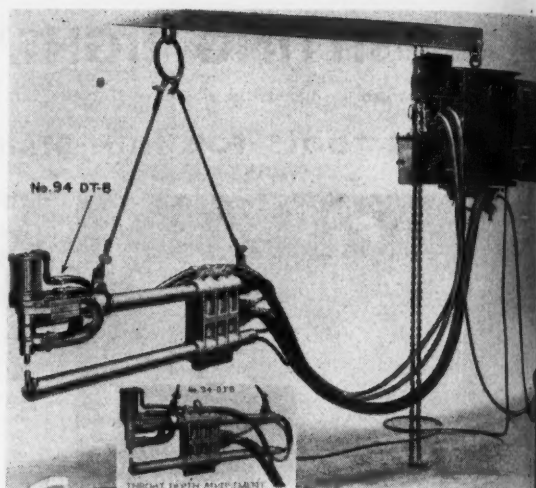
Eisler Portable Air-Operated Gun Welder

The Eisler Portable Air-Operated Gun Welder is manufactured in sizes from 30 to 150 k. v. a. and is adjustable to provide throat depths from 12 to 48 inches.

T-J "Rivitor"

Especially adapted to the job of piercing, dimpling, and riveting ears on pails using 1 3/4-lb. tinnings' rivets, the electrically-powered T-J "Rivitor" shown herewith is now being manufactured by The Tomkins-Johnson Co., Jackson, Michigan.

Rivets are underfed by the machine as on a standard underfeed Rivitor. The



unpierced pail and ear are placed over the rivet and properly located by gages. When the ram of the machine descends a combination piercing and dimpling die mounted on a spring actuated pressure



FISCHER Oil Groovers

A wide variety of grooves may be cut on the "FISCHER" . . . with minimum set-up time and cost.

Bearing in which groove is to be cut is mounted on revolving chuck secured on work spindle. Boring tool is secured to carriage slide which has a reciprocating motion timed with work spindle and lined by crank gear and connecting rod.

Several attachments can be furnished for cutting practically any type of oil groove.

Capacity of No. 1 Machine—3" dia. . . . No. 2 Machine—15" dia.

Write for catalog.

FISCHER MACHINE CO.

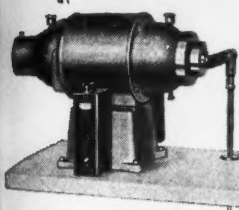
310-16 N. ELEVENTH ST. PHILADELPHIA, PA.

IDEAL SPEED LATHES

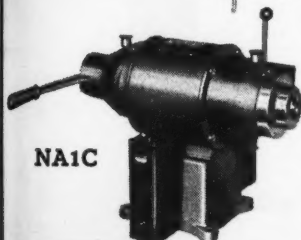
For accurate, uniform,
speedy finishing of
metal & plastic parts.



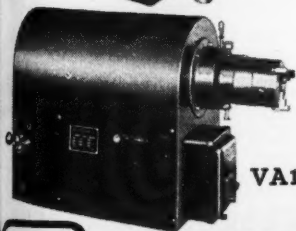
AWARDED
October '42



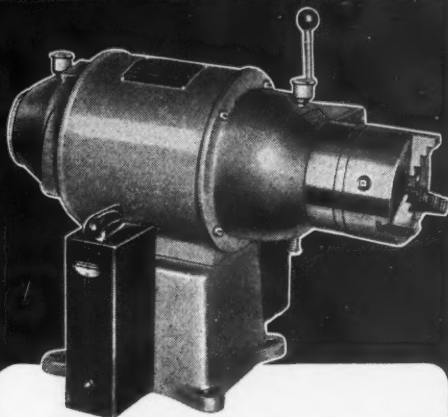
NA1E-



NA1C



VA1B



POLISH • LAP • DE-BURR • FINISH

NA1B (above) - for general finishing of gears, pulleys, dies, and other large pieces - metal or plastic.

NA1E - foot-operated collet type, for high-production finishing of many identical small parts.

NA1C - with hand- or foot-operated collet, to take up to 1" round stock.

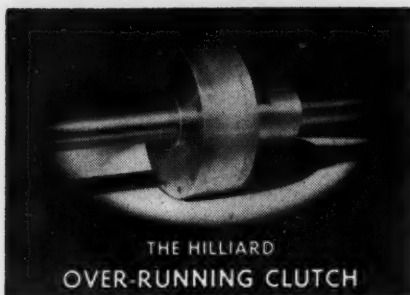
VA1B - variable speed lathes, in bench and pedestal models, chuck and collet types.

*If you have a finishing problem
WRITE FOR CATALOG 440*

SCHAUER MACHINE COMPANY

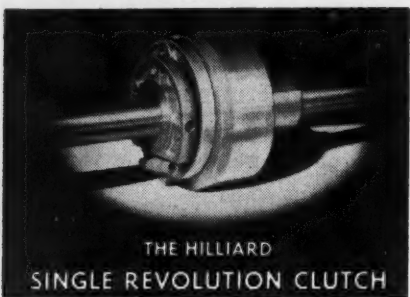
ORIGINATORS OF TODAY'S SPEED LATHES
2060 READING ROAD CINCINNATI 2, OHIO

MODERN MACHINE SHOP 241



THE HILLIARD
OVER-RUNNING CLUTCH

A "Free Wheeling" Clutch of simple design recognized for many years as "Standard Equipment" for Automatic Dual Drive operation—Automatic operation of 2 Speed drive—As a ratchet permitting infinite adjustment and as an automatic backstop. Furnished in a number of types.



THE HILLIARD
SINGLE REVOLUTION CLUTCH

Wherever extremely accurate control of intermittent machine operation is essential the Hilliard Single Revolution Clutch is unequalled. Its accuracy has won for it the acceptance of Industry for cutting, punching and packaging operations.



★
WRITE TO-DAY!

For the new series of 6 illustrated Bulletins furnished FREE upon request. Featuring our complete line of Industrial Clutches and Couplings—Over-Running—Single Revolution—Friction—Centrifugal—Overload Release—Slip.

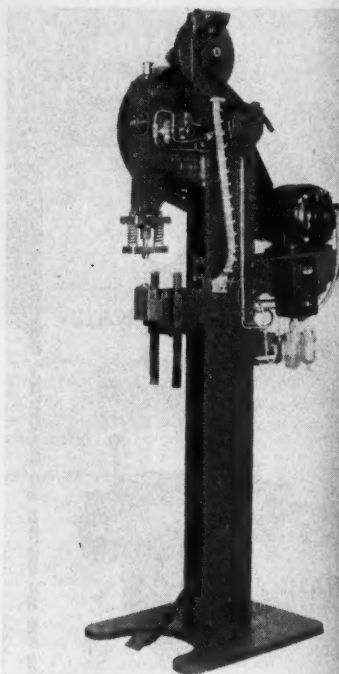
THE HILLIARD CORPORATION

117 W. 4th St.

ELMIRA, N. Y.

Manufacturers of
INDUSTRIAL CLUTCHES

pad attached to the ram forces the work over the rivet, thereby piercing and forming a dimple in the pail and ear. The dimple is deep enough to prevent the manufactured head of the rivet from projecting inside the pail. At the end of the down stroke of the Riviter,



T-J "Riviter"

the rivet set (not visible in the illustration because of the pressure pad) forms a slightly rounded head on the rivet.

Bliss 5,000-Ton Two-Die Slide Hydraulic Press

The illustration herewith shows 5,000-ton two-die slide hydraulic press built by the E. W. Bliss Co., 53rd St. and 2nd Ave., Brooklyn 32, N. Y. The machine incorporates the use of the rubber die process, which is said to be so ideally adapted to the diversified production of the aircraft industry, together with modern material handling

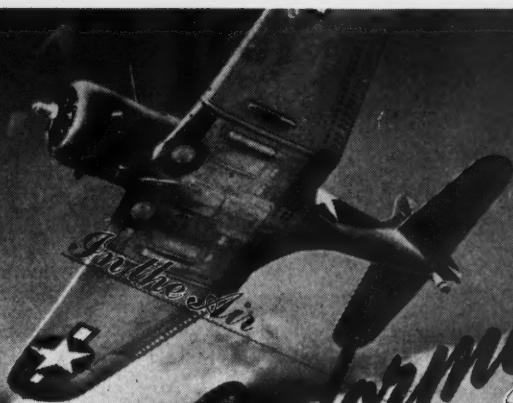
ces the
piercing
bail and
to pre-
the rivet
At the
Rivitor.

e illustra
(ad) form
rivet.

e Slide

shows
clic pres
53rd St
N. Y. Th
se of th
said to b
rsified pr
dustry, t
l handling

January, 1945



FOR

Proven Performance

SPECIFY CURTIS

Universal joints play an important part in the operation of airplanes and machine tools.

Where out-of-line transmission of power, or rotation of shafting around corners or at angles is necessary — strains and wear on universal joints working at such angles are excessive.

Engine controls—retractable landing gear—auxiliary power controls and elevator spars must have smooth, positive operation for the pilot and his crew.

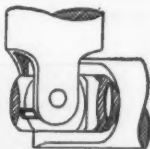
In machine tools too — failure of any part means loss of production and costly repair shutdowns of multiple drill presses, grinders, milling machines, etc.

Curtis Universal Joints, made to Curtis "Standards" have PROVED their ability to "take it." The rigid Army Air Corps Class 1 specifications for strength and toughness are met and surpassed by Curtis Joints.

Through years of experience Curtis applied special steels and developed proper heat treatments to secure maximum strength and toughness. Accurate machining and fitting to close tolerances gives smooth, free-working surfaces — Curtis oilers insure proper lubrication — and the patented "Telltale" lock ring tells at a glance that each part is firmly locked together and permits rapid disassembly and reassembly in the field.

All these plus magnaflux inspection by certified operators give Quality Control thruout production.

Specify Curtis Universal Joints in any of their 14 sizes — let Curtis Engineers work with you on your problems — be sure of "Proven Performance."



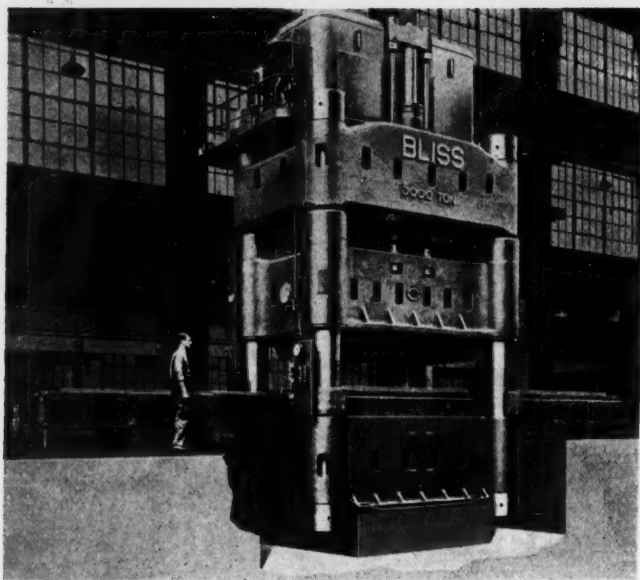
↑ NOTE: End of Curtis patented "Telltale" lock ring is readily visible — showing that joint is securely locked together.



CURTIS UNIVERSAL JOINT CO. INC.

SPRINGFIELD, MASS. • BOSTON GEAR WORKS, NO. QUINCY, MASS., SOLE DISTRIBUTORS

MODERN MACHINE SHOP 243



Bliss 5,000-Ton Two-Die Slide Hydraulic Press

less electric drive of die slides; accurate positioning and fitting of die slide to rubber pad; and twin hydraulic pumping units and circuit.

Specifications of the machine are as follows: pad size, 50 x 144 x 12 inches; maximum stroke, 40 inches; floor space overall, 560 x 170 inches; height overall, 30½ feet; height from floor, 26 feet.

devices such as automatic die slide.

Outstanding among the features of the press is the automatic cycle which causes the die slide to move into its position in 4½ seconds, the stroke of the die slide being 168 1/16 inches. As soon as the die slide is in position, the machine completes a pressing cycle, with pressure independently adjustable for each die slide. At the completion of the press cycle, the die slide automatically moves out into its loading and unloading position.

Other features of the press include universal electric control; interlocked safety sequence operation; provision for addition of third and fourth slide; shock-

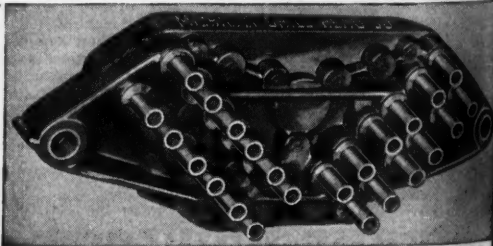
Denison Multipress

Applicable to the speeding up of operations requiring anywhere from 300 to 800-lb. pressures in single or repeated up and down strokes, an oil-hydraulic bench press to be known as the Multipress is now being introduced by The Denison Engineering Co., Columbus 10, Ohio. The press is designed to deliver up to 4 tons downstroke pressure and up to 5000 lb. "pull up" pressure. In addition, it is especially designed to utilize a wide variety of accessories and fixtures for performing various production operations, such as pelleting, honing, broaching, peening, assembling,

Pictured: a 24-Spindle Heavy-Duty Drill Head.

**DESIGNERS AND
MANUFACTURERS
OF MULTIPLE DRILL-
ING EQUIPMENT.**

We invite your inquiry.



MICHIGAN DRILL HEAD CO.

911 E. 8-Mile Road, Hazel Park, Mich.

New Speed in The GLENNY

Patent
No. 2,184,383

SEND
FOR
BULLETIN
9

and Accuracy KEYWAY BROACHING Adjustable-Expansion Push BROACH

MAINTAINS $\pm .0005$ ACCURACY
IN EVERY PIECE BROACHED

Broaches slots of greatest accuracy to an average length of four inches and up to $\frac{5}{8}$ " widths.

May be used on an Arbor Press, Lathe, Screw Machine and other standard equipment.

Has many valuable uses in shop and factory.

10 TIMES FASTER THAN BY ORDINARY METHODS

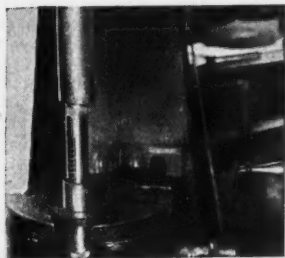
Actual tests in cutting keyways $\frac{3}{16}$ " deep, $\frac{3}{8}$ " wide, $1\frac{1}{2}$ " I. D. 3" long, in a steel bushing proved ten times faster than by the handling of the same job on a shaper. Send for Bulletin 9. Learn more of this and similar operations. Get full information on the Broach.

DEPT. B, EAST SHORE MACHINE PRODUCTS CO.

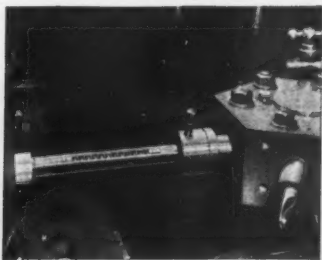
835 EAST 140th STREET

CLEVELAND 10, OHIO, U. S. A.

Glenny Broach in use
on Arbor Press.



Glenny Broach in use on
Turret Lathe in series with
other operations.





**AIR CONTROL is the Secret
of precision tapping
The Haskins Way**

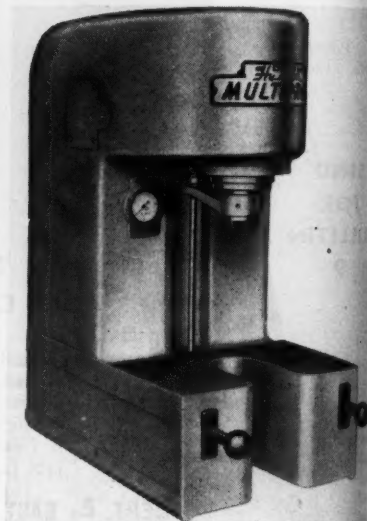
Accuracy—to a class 4 fit when necessary—is constant—each part is tapped exactly like every other, independent of operator efficiency. AIR regulates the complete tapping cycle—not only the down stroke, but its control is so sensitive that the tap is allowed, in effect, to float out of the part. Tap life is longer—tap breakage practically eliminated. Send today for your copy of catalog on Tapping—The Haskins Way. R. G. Haskins Co., 620 South California Avenue, Chicago, Illinois.



burnishing, straightening, and so on.

Completely self-contained the Denison Multipress features a streamlined housing measuring 16 x 26 x 34 inches and weighs 745 lb. All working parts within the frame are of unit construction and are readily accessible and removable for inspection. Manually controlled, the press has a daylight opening of 11 inches and throat opening of 6 inches, and is equipped with a table 16 x 10½ inches. It is powered by a 3 h. p. electric motor.

The machined flat sides of the Deni-



Denison Multipress

son Multipress together with the absence of any projecting parts make it especially suited to gang-type arrangement in a minimum of space. A pressure gage is located in the throat of the unit. The ram is guided and prevented from rotating by a banjo-type guide which travels on the shipper rod. A U-shaped opening in the base permits the performance of assembling, disassembling, stamping, and punching operations.

"Hy-Mac" Hydro-Squeeze Gun

A portable 1½-ton capacity hydraulic press with offset platen and ram, identical

so on.
the Deni-
reamlined
34 inches
ing parts
construc-
e and re-
ally con-
ght open-
opening of
n a table
wered by
the Deni-

a the ab-
s make
e arrange-
A pres-
coat of the
prevents
type guid-
r rod. A
e permit-
ng, disas-
chong op-

ze Gun

hydraulic
am, identi-

January, 194

THREADWELL
GREENFIELD



EXTRA Production Per Tap — because the Threadwell *Cold-Temper* treatment produces taps of extreme hardness — taps that stand up to plastics or other abrasive materials as well as all metals and ask for more.

EXTRA Long Tap Life — because *cold-tempering* actually makes Threadwell Taps less brittle while it increases their hardness.

EXTRA Convenience In Use — Threadwell *COLD-TEMPER* Taps have all the popular and distinctive Threadwell convenience features.

Tap "i-dot-ification" (*red* dot on the shank of high speed cut thread taps, *white* dot on commercial ground thread, *blue* dot on precision ground).

Tap-Capsule, every ground thread tap in its individual transparent plastic tube for complete protection and instant identification without unwrapping.

Greaseless rust-proofing, clean and dry to handle, always.

EXTRA Attention To Your Needs — *personal* attention to every order at the factory and by your Threadwell distributor.

Why not try something new and better in Taps? It costs no more. Specify *Threadwell COLD-TEMPER* next time you order Taps.

DISTRIBUTORS IN LEADING INDUSTRIAL CENTERS
THROUGHOUT AMERICA
EXPORT STOCKING DISTRIBUTORS
CANADA, Bridge Machinery Co., Montreal;
ENGLAND, Skylux Ltd., London and John H. Graham and Co., Inc.
THROUGHOUT THE WORLD



THREADWELL TAP AND DIE COMPANY • GREENFIELD, MASSACHUSETTS, U.S.A.



"Hy-Mac" Hydro-Squeeze Gun in Use

fied as the "Hy-Mac" Hydro-Squeeze Gun and built for pressures up to 1000 lb. per square inch, is announced by Hydraulic Machinery Co., Inc., 12825 Ford Rd., Dearborn, Mich. "O" ring-type seals are used on the piston of the unit. Ball-type switches are conveniently located on the press for use in

controlling a spring returned four-way valve. As long as both switch buttons are pressed, the valve solenoid is energized and oil under pressure is valved into the Hydro-Squeeze Gun, moving the ram through a working stroke of 1½ inches. When one or both buttons are released, the valve solenoid is de-energized and the ram starts the return stroke.

The offset platen and ram are constructed to accommodate numerous special adapters for various operations, such as pressing bushings and pins, riveting, dimpling, and so on. The Hy-Mac Hydro-Squeeze Gun is especially designed for reaching hard-to-get-at places. A standard Hy-Mac hydraulic power unit complete with pump, motor, tank, and valves generates the hydraulic power for operation of the gun. Power units with sufficient capacity for powering numerous guns from a single unit can be furnished. High pressure hydraulic hose connects the guns to the power unit.

Sheffield "Thredchek" Gage

Incorporating the principles of the indicator snap and thread roll-snap gage.

DEARBORN

Automatic

CHUCKING and INDEXING FIXTURES

For Fast Milling and Drilling

Model C was designed to meet the demand of faster machining and accurate indexing of small pieces on bench and hand milling machines.

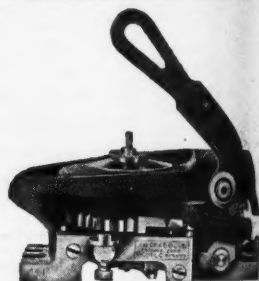
SPECIFICATIONS:

	Model B	Model C
Height to top of collet	5½"	3½"
Center of collet to back of fixture	3¾"	2"
Collet capacity	1" round	¾" round
Cuts per hour on free machining material	1000	1500

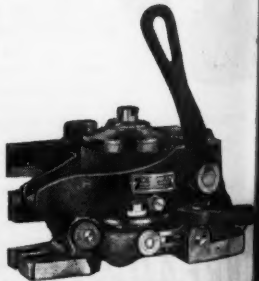
Work held by automatically opening and closing collets. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces.

WRITE FOR FOLDER.

J.W. DEARBORN ANSONIA, CONN.



MODEL C



MODEL B

our-way
buttons
is ener-
s valved
moving
stroke of
buttons
d is de-
the re-

are con-
numeros
operations,
and pins.
The Hy-
especially
-to-get-at
hydraulic
p, motor.
hydraul-
the gun.
capacity for
a single
pressure
ins to the

Gage
of the in-
map gage.

**Amazing
Speed on
CUT-OFF
WORK**

**Kalamazoo
COOLANT MODEL
Metal Cutting
Band Saw**



A modern, high speed, low cost production unit for cutting off rods, bars, tubes or odd shapes to lengths. Extremely accurate. Narrow kerf saves costly metal. Labor saving automatic operation. No heat generation. Long life for saws.

Coolant attachment is compact and has no messy floor pans.

Portable and plugs in anywhere. Casters optional.

Machine can be furnished without coolant for intermittent cutting.

Two sizes—8" x 16" and 8" x 24".

Ask your dealer for bulletin.

MACHINE TOOL DIVISION

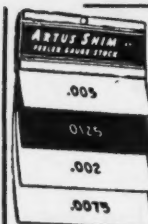
KALAMAZOO TANK & SILO CO., Kalamazoo, Mich.

January, 1945

January, 1945

MODERN MACHINE SHOP 249

a gaging instrument which is designed to afford a complete and accurate check of threaded parts, to be known as the "Thredchek" has been placed on the market by The Sheffield Corp., Dayton 1, Ohio. The instrument includes a standard balanced type large indicator graduated in 0.0001 inch and employs the same "go" and "no go" rolls as a thread roll-snap gage. However, the top no go roll is not fixed, and its movement is registered on the indicator, showing how low or high the pitch diameter of the threaded part is. A free-rotating backstop enables the part to be properly located when presented



ARTUS PLASTIC SHIM & FEELER GAUGE STOCK

The COLOR tells the THICKNESS

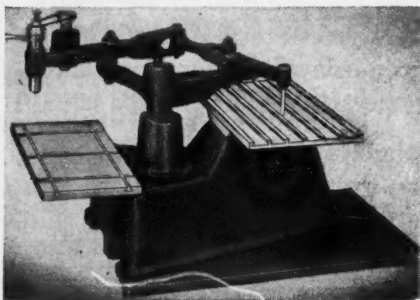
Long lasting plastic, replaces scarce metal. Each thickness a distinctive, easy to identify color. Impervious to oil. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock. 12 colors—12 thicknesses (.001-.030). Bound together. \$3.75.

Order today. Immediate delivery.

INDUSTRIAL PRODUCTS SUPPLIERS

6 Broadway

New York 4, N. Y.



DUPLICATING and PROFILING

AUTO - ENGRAVER

Accurate Engraving with Unskilled Operators
Unskilled operators will profile or accurately reproduce in smooth lines any design, number, letter, emblem; on iron, brass, copper, aluminum, soft steels and all plastics. Here are some of its other uses . . . Drills a series of holes, or profiles small parts. • Cuts an even channel for wiring on panels. • Increases accuracy and production. • Works from original drawing or templates. • Etches glass and similar items. • Will not cause distortion. For information and prices write Dept. M.

AUTO-ENGRAVER COMPANY

1776 Broadway, New York, N. Y.



Sheffield "Thredchek" Gage

to the no go rolls and thereby is said to eliminate the possibility of "cocking."

If a part passes the go rolls, the lead, thread angle, and pitch diameter are shown to be within maximum tolerance limits, and the part will assemble. The indication of the pitch diameter when the part is presented to the no go rolls separates the check of pitch diameter from the check of the lead. If the pitch diameter is correct, then it is known that the lead is correct. Correctness of the form or angle can be checked visually as the work is passed. If the pitch diameter is correct, then it is known that the lead is correct. Correctness of the form or angle can be checked visually as the work is passed. If the pitch diameter is correct, then it is known that the lead is correct. Correctness of the form or angle can be checked visually as the work is passed. If the pitch diameter is correct, then it is known that the lead is correct. Correctness of the form or angle can be checked visually as the work is passed.

SEND US YOUR PRINTS FOR Quotations.

**THREAD GRINDING
BROACHING
MAGNETIC INSPECTION**



**TAYLOR
MACHINE COMPANY**
MANUFACTURERS OF
AVIATION & AUTOMOTIVE PARTS
Gear Specialists
1917 EAST 61ST ST. CLEVELAND, OHIO



NICHOLSON

is now in the
ROTARY FILE
field—"with
both feet"

(Hand Cut and Ground types)

NICHOLSON has the mill-supply distributing facilities to assure a near-at-hand source of Rotary Files in the types and sizes you may need.

NICHOLSON has the engineering service to aid in the proper use of Rotary Files; and to help in the selection of *The right file for the job.*

NICHOLSON Rotary Files are as sweepingly guaranteed for quality as the Nicholson hand files famed throughout the world for their slogan — *Twelve perfect files in every dozen.*



Nicholson File Co., 83 Acorn St.
Providence 1, R. I., U. S. A.
(In Canada, Post Office, Ont.)

**WRITE FOR OUR
ROTARY FILE CATALOG**



HAND CUT



GROUND

showing both *Hand Cut* and *Ground* types. Each type is available in 16 standard styles or shapes; in 3 cuts (Coarse, Medium and Fine); in 64 sizes and in diameters $\frac{1}{8}$ " to 2".

**ORDER THROUGH YOUR
MILL-SUPPLY HOUSE**

NICHOLSON ROTARY FILES
HAND CUT and GROUND FOR EVERY PURPOSE

**NICHOLSON
USA**

94 95



**MANY STYLES
For Many Uses
WALDEN
WORCESTER**

Tools are designed
for a purpose . . .
Our catalog pictur-
ing more than a
hundred Auto-
motive Aircraft and
Radio Tools is
yours for the
asking.

**WALDEN
WORCESTER
WRENCHES**

STEVENS WALDEN, INC.
468 SHREWSBURY STREET
WORCESTER, MASSACHUSETTS

The Sheffield Thredchek Gage can be placed in a standard thread roll-snap stand and used at a bench for the fast, accurate checking of production parts. It also provides a convenient hand gage for checking threaded parts at or in a machine. Allowance for wear is compensated for by adjusting the rolls of the gage on their eccentric pins.

Removable and Reversible Roller Top for Lyon-Raymond Hydraulic Elevating Tables

The Lyon-Raymond Corp., 1797 Madison St., Greene, N. Y., announces a re-



Removable and Reversible Roller Top for Lyon-Raymond Hydraulic Elevating Tables

movable and reversible roller top for its hydraulic elevating tables. The top may be supplied as a part of a new table or can be obtained for a table already in use.

The roller top consists of a rigid, welded framework supporting ball bearing conveyor rolls. Quick installation

can be
ill-snap
e fast.
parts.
d gage
or in a
s com-
rolls of

Roller
drau-

Y Madi-
es a re-

Top for
Tables

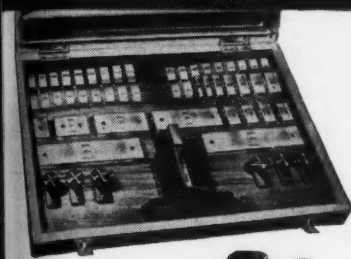
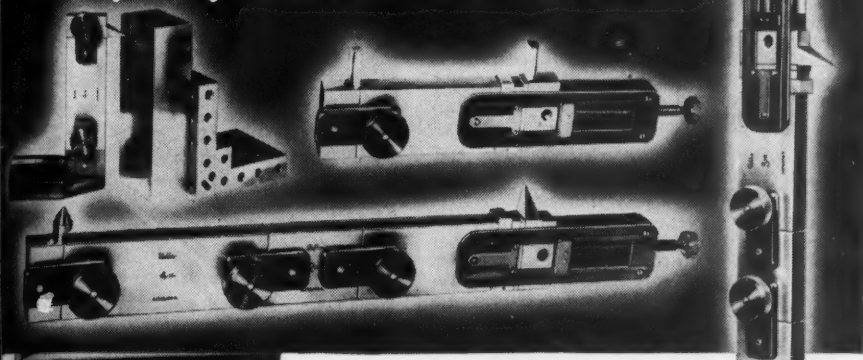
Top for its
The top
of a new
a table

a rigid,
ball bear-
station

January, 1945

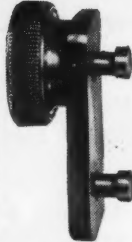
WEBBER

Heavy Duty GAGE BLOCKS

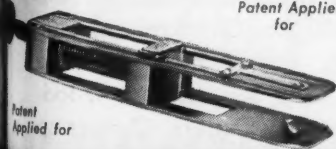


Webber Eccentric Clamp
used to unite several blocks
quickly into one solid, accurate
gage.

**Webber Quick Acting
Clamp** snaps onto the end
of any of the long blocks and
firmly holds any other blocks
necessary to make up the frac-
tion of an inch. Only one of
these is required with each set.



Patent Applied
for



Patent
Applied for

A handy, complete set of blocks and clamps for making precision measurements up to 36 inches. Additional blocks and clamps available for increasing capacity.

With this set everything you need is in the set. There are no loose pins, screws or small parts which take time to assemble and are easily lost.

The Webber Eccentric Clamp and the Quick Acting Gage Clamp permit quick, easy assembly of blocks into a unit of precision measurement. There is positively no change in dimension due to clamping action.

**Webber offers two
Heavy Duty Gage Sets:**

**No. 24 Range from
.300" to 24.000" in
steps of .0001".**

**No. 36 Range from
.300" to 36.000" in
steps of .0001".**

Write today for bulletin illus-
trating and describing this
compact, useful set of gages
for precision measuring.



Webber

GAGE COMPANY

12899 TRISKETT RD. • CLEVELAND 11, OHIO

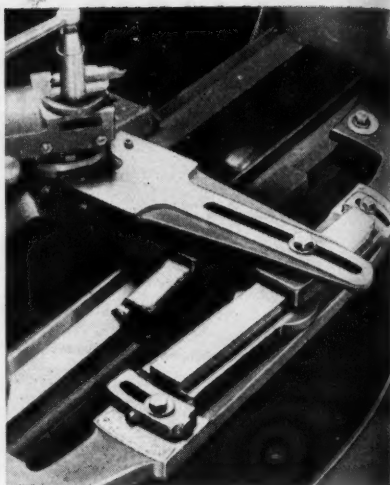


or removal of the roller top is possible since the framework fits down over the permanent top, thus eliminating any need for bolts or other fastenings. Since the table top is square the roller top can be placed for conveying work from front to back or from side to side. Equipped with the roller top, a hydraulic elevating table can be readily used in conveyor systems to afford a change in level or direction. The roller top is also said to be useful in many die handling and feeding operations.

Master Taper Attachment

A taper attachment of simplified design is announced by the Master-Taper Co., 126 N. Clinton St., Chicago 6, Ill. The attachment provides for the accurate taper turning, boring, threading, and so on, of work and may be used in any position on the lathe without interfering with the performance of straight turning operations.

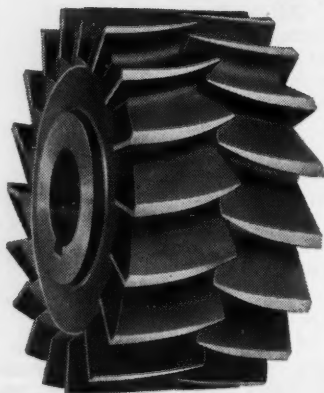
The sliding fixture includes straight gibs to eliminate vibration and tool play. Graduations provided are in inches at one end and in degrees at the other end of the swivel bar of the



Master Taper Attachment

attachment, which allows for the production of tapers up to $3\frac{1}{2}$ inches per foot, $16\frac{1}{2}$ deg. maximum in either di-

Aber CURVED TOOTH Milling Cutters with "Chatterless Flowing Action"



Patented

- HIGHER SPEED (R.P.M.)
- LONGER CUTTING SURFACE
- LONGER LIFE

Types:

Plain Milling, Staggered Tooth Side Milling, RH or LH Half Side Milling, Overlapping Side Milling, Right and Left Hand Shear Side Milling and Woodruff Keyway Cutters. Cutters up to 14" Diameter.

Write for Literature

ABER ENGINEERING WORKS INC., WATERFORD, WIS.

"Fractional Grades" Provide Consistently Better Tool & Cutter Grinding

Bay State Grinding Wheels give you 3-to-1 better chance of "fitting the grade to the grind" ... because Bay State makes them in fractional grades.

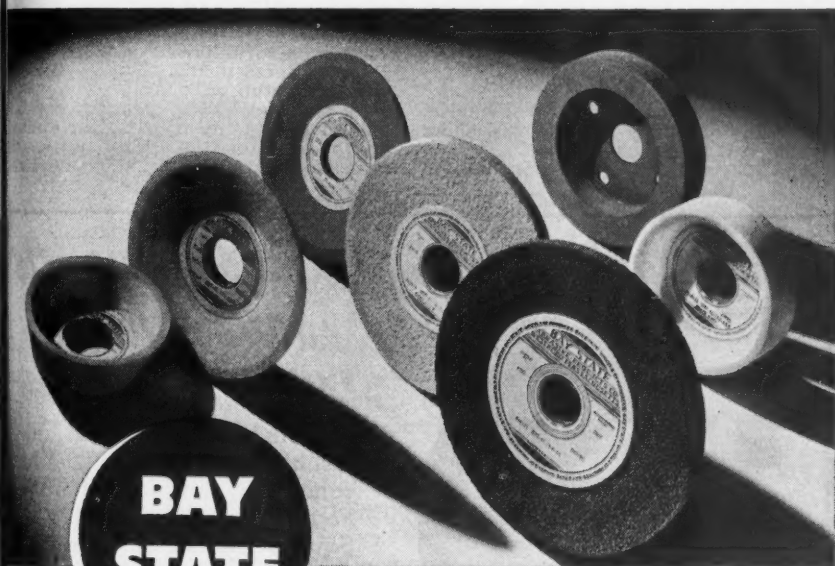
This exclusive development produces wheels in *three* distinct degrees of hardness within the *one* grade offered by other manufacturers. This also assures closer duplication on every reorder.

This exclusive feature and other engineering extras also explain why Bay State Mounted

Wheels and Points, and other Bay State leaders, rate at the top in quality.

How Bay State combines special temper abrasives and bonds for better all-round tool and cutter sharpening ... and how "Koolpore Wheels" give even cooler, faster cutting on high speed steels and tungsten carbides ... are treated in detail in our Tool and Cutter Bulletin. Write for it today.

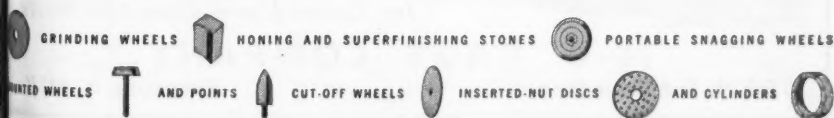
BAY STATE ABRASIVE PRODUCTS CO.
WESTBORO, MASS.



**BAY
STATE**

ABRASIVE PRODUCTS

TOP PERFORMANCE CONSISTENTLY DUPLICATED



GRINDING WHEELS

HONING AND SUPERFINISHING STONES

PORTABLE SNAGGING WHEELS

MOUNTED WHEELS

AND POINTS

CUT-OFF WHEELS

INSERTED-NUT DISCS

AND CYLINDERS

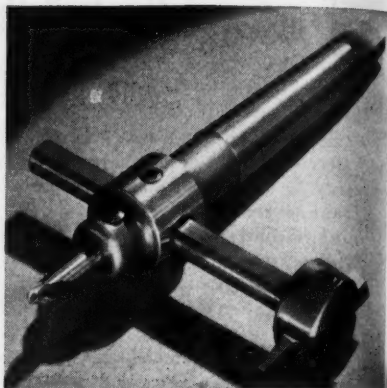
WIS.

January, 1945

MODERN MACHINE SHOP 255

rection, $7\frac{1}{2}$ inches in length at one setting. Duplication of tapered parts is said to be easily accomplished with the attachment.

Ease of application is an outstanding feature claimed for the Master Taper Attachment, which is sturdily constructed and provided with adjustments for compensating for wear. The attachment can be accurately fitted to Logan 10-inch, Atlas 10-inch, South Bend 9-inch, Sheldon and Clausing lathes. Taper attachments for other lathes are manufactured to order.



Rieger Circle Cutter

Rieger Circle Cutter

Production of a tool for cutting holes in metal, fiber, and other flat materials, to be known as the Rieger Circle Cutter, is announced by The Rieger Mfg. Co., Dept. MMS-9, Miamisburg, Ohio. The tool includes a cross-arm which is adjustable for cutting holes from 2 to 8 inches in diameter. A $\frac{1}{4} \times \frac{1}{4}$ -inch tool bit of any desired contour is fastened by means of a set screw in the holder at the end of the cross-arms.

The Rieger Circle Cutter can be used

in a lathe, drill press, or electric drill, being centered in the work by means of a $\frac{1}{4}$ -inch stub pilot drill. The tool is said to have ample strength for machining holes in $\frac{1}{4}$ -inch plate steel. By the use of a suitably ground bit, the periphery of the hole cut can be straight.

Adjustable Limit Snap Gage Specialists *For 28 Years*

Exclusive Features



1. Patented locking device, adjusting and locking means completely housed within the head.
2. Square shanks on pins and anvils to prevent turning in the holes.
3. Light weight but very strong frame to give user a better sense of feel on his work.

For Catalog and Price List Write

M-G GAGE COMPANY

107 N. Franklin Street

Syracuse 4, N. Y.

*Do it Faster
by Air!*

SPEEDY AIR VISE

GRIPPING FORCE 15 TIMES AIR LINE PRESSURE!

America's war plants are switching to new, powerful Speedy Air Vises! From a single vise . . . to an installation of fifty . . . they are saving time, effort and labor costs! Air operated, *foot controlled*—both hands are left free for more rapid drilling, tapping, light milling, assembly, etc. **\$24** Complete with Foot Control Valve, Air Hose and Fittings, only

DELIVERY 7-10 DAYS! ORDER FROM YOUR MILL SUPPLY DEALER OR WRITE DIRECT

AIR REGULATOR

Precision - built.
Delivers pressures
up to 140 lbs. With
gauge. \$4.
Less gauge. \$2.50



AIR FILTER

Keeps water
and particles
out of the
regulator and
pneumatic
tools. \$1.50

BLOW-GUN

Looks and
operates
like a gun. Ideal for
cleaning and blowing
out chips, dust, filings,
scraps, etc. . . \$2.50

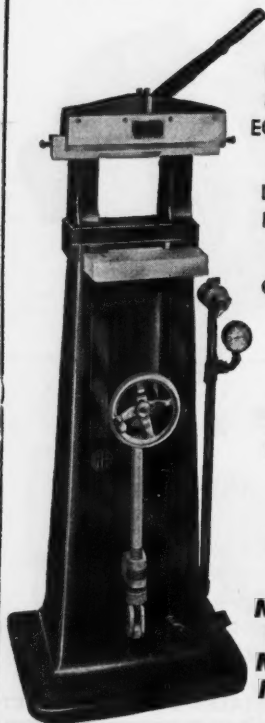


R. BROWN CORP., 5725 ARMITAGE AVE., CHICAGO 39, ILL.

January, 1945

MODERN MACHINE SHOP 257

QUICK MARKING FOR PART NUMBERS



MARKING
BY ROLLING
IS FAST AND
ECONOMICAL.

PRESERVES
DIE LIFE AND
PIECE PARTS.

REQUIRES
ONLY FRACTION
OF APPLIED
PRESSURE
AS COMPARED
TO STAMPING.

QUICK
SET-UPS

**MODEL 25
HI-DUTY
MARKING
MACHINE**

This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

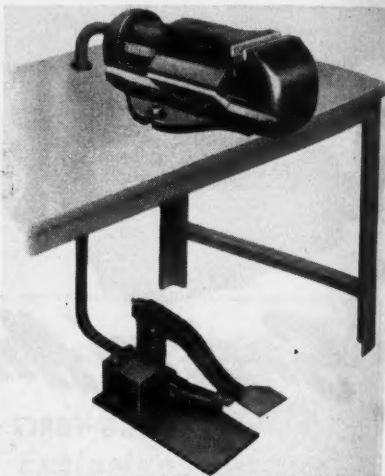
GEORGE T. SCHMIDT, Inc.
1806 BELLE PLAINE AVE.
CHICAGO 13, ILLINOIS

chamfered, rounded, or stepped.

The Rieger Circle Cutter is available in two standard models, one having a $\frac{1}{2} \times \frac{1}{2}$ -inch round shank, and the other a No. 2 Morse taper shank. Special models can be made to order. The tool is constructed of heat-treated alloy steel, which is ground to size.

Reimuller Hy-Speed V-Way

A high speed vice featuring V-ways, rugged semi-steel construction, and hydraulic foot control is now being manu-



Reimuller Hy-Speed V-Way Hydraulic Vice

factured by Reimuller Brothers Co., 9900 Belmont Ave., Franklin Park, Ill. In addition to use in holding materials, the Reimuller Hy-Speed V-Way Hydraulic Vice can be used as a production press for small precision upsetting, heading, and other small operations requiring dies or tooling.

The hydraulic foot control includes two levers—one for applying pressure up to rated tonnage and another (with two-speed return) for releasing pressure. No outside air lines or power is required in operating the vise.

Equipped with flexible hydraulic hose to allow for installation on machines and benches of various types, the Reimuller Hy-speed V-Way Hydraulic Vice is available in a 4-ton size with 4-inch opening and 7-ton with 7-inch opening.

available
having a
the other
Special
r. The
ed alloy

Way

V-ways,
and hy-
g manu-

ulic Vise

s Co., 9400
t, Ill. In
materials.
Way Hy-
a produc-
upsetting,
rations re-

includes
pressure up
(with two-
pressure
ver is re-
raulic hose
machines
, the Rai-
raulic Vise
with 4-inch
h opening.

January, 1963

GRIPOMATIC

Exclusively an

OTC PULLER

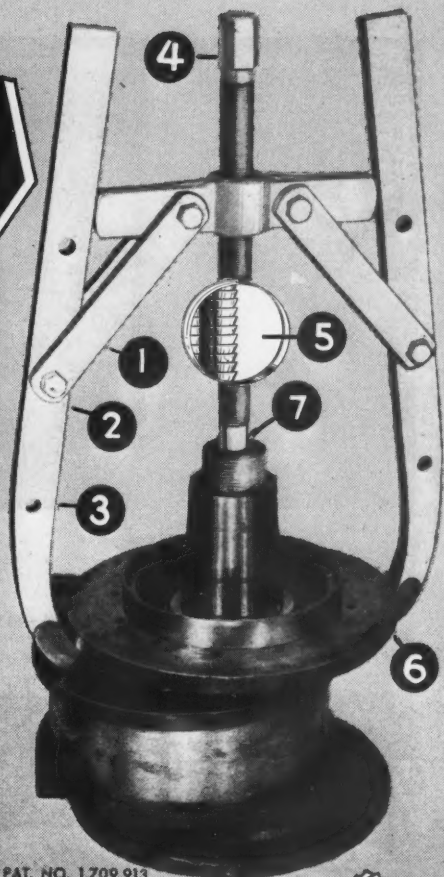
Engineered for DEPENDABILITY

1. Patented linkage gives automatic, positive, non-slip grip.
2. Bolts act as safety link.
3. Quickly adjustable for length.
4. High alloy steels screw and head.
5. Power Pitch screw—32% more power.
6. High alloy, drop forged, heat-treated jaws—thinner, stronger, safer.
7. Self-centering dog point forcing screw.
8. Sizes for all needs—up to 50 ton capacity.

ASK YOUR SUPPLY HOUSE or
write for Industrial Bulletin

OWATONNA TOOL CO.

357 Cedar Street
OWATONNA, MINN.



PAT. NO. 1,709,913

Removing a Bearing
Cage—one of many
pulling jobs made easy
with a GRIPOMATIC.

Handy McManick



OTC

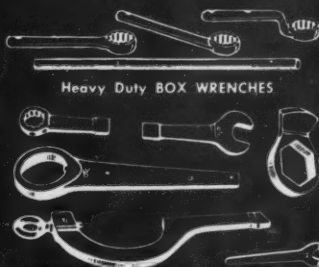
TOOLS

for MACHINE
MAINTENANCE



GRIPOMATIC
PULLERS

PUSH-PULLERS



Heavy Duty BOX WRENCHES

SLIDING WRENCHES, SPECIAL TOOLS



DoAll Buttress Saw in Use

DoAll Buttress Saw

Featuring long life, a buttress saw for use in cutting ferrous and non-ferrous alloys, as well as non-metallic

materials, has been developed by The DoAll Co., 254 N. Laurel Ave., Des Plaines, Illinois.

According to the manufacturer, an innovation in the design of the saw teeth provides for rapid sawing, parallelism and close tolerance of the entire finished cut. Tooth gullets are elongated to afford sufficient space for fast removal of chips, thus assuring cool, continuous cutting. The teeth are firmly anchored to withstand shock and are heat-treated.

Made of high carbon steel in order to impart abrasive resistance to the sharp cutting edges of the teeth, the DoAll Buttress Saw is available in widths from $\frac{1}{4}$ to 1 inch, having various sets and pitches.

Cadillac Stellite Thread Plug Gage

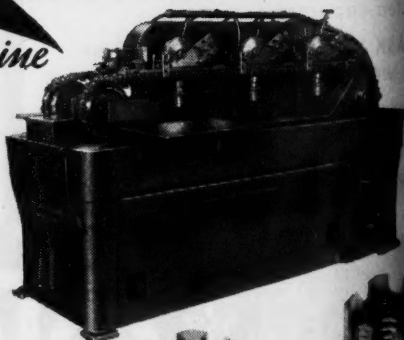
Especially designed to afford long life, a Stellite thread plug gage for use in the gaging of precision parts made of materials varying in their abrasive qualities is now being offered by the Cadillac Gage Co., Detroit, Mich. Having a low coefficient friction, the gage is said to resist wear effectively and, being

"DUPLIX" Nut Slotter!

Special Purpose Machine

**Slots 2 Sizes
at Once . . .**

Two continuously operating conveyors . . . Highest obtainable production... Automatic burr removal... As high as 3000 slotted nuts per hour... 2 machines covering hexagon sizes from $\frac{3}{8}$ " to $2\frac{1}{2}$ " . . . ALSO ADAPTABLE TO MILLING OF PARTS OF SIZES COMPARABLE TO NUTS.



PELLOW MACHINE Co.

13510 FOLEY AVE., DETROIT 27, MICH.

by The
ve., Des

er, an in-
saw teeth
parallelism
ntire sin-
elongated
fast re-
cool, con-
re firmly
and are

in order
e to the
teeth, the
available in
ving vari-

ug Gage
long life.
for use in
made of
asive qual-
the Cadil-
Having a
gage is
and, being

er!



January, 1945

Machine Tool- GEARSHIFT DRIVES



by

LIMA



WATCH OUR AD.

for future

*Important
Announcements!*



THE LIMA ELECTRIC MOTOR CO.

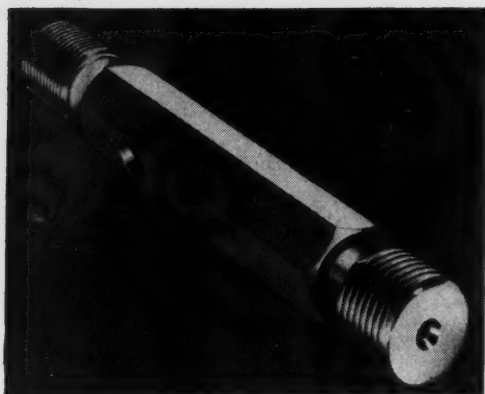
199 FINDLAY ROAD

LIMA, OHIO

REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES - LIMA ELECTRIC MOTORS
LIMA MAGNETIC POLISHING LATHES - LIMA PEDESTAL GRINDERS





Cadillac Stellite Thread Plug Gage

Gage is available in standard sizes from No. 6 to 15 inches in diameter; also, in special pitch diameters according to user specifications.

Arcometer

An instrument for measuring arcs along the circular edge (internal or external) of a surface, to be known as the Arcometer, is announced by the Peterson Precision Instrument Co., 10144 S. State St., Chicago 29, Ill. The instrument is said to be ideal in the layout of bolt holes on flanges, spacing ribs on circular bodies, spacing blades in impellers, and so on.

In operating the Arcometer, the corners of the heads are brought against the edge of the work, and the arms are

acidproof and corrosionproof, its accuracy is never impaired by moisture or other corrosive agents, the manufacturer states. In addition, the gage is said to be non-magnetic and to have an exceptionally low affinity for other materials, making it easy to manipulate.

The Cadillac Stellite Thread Plug

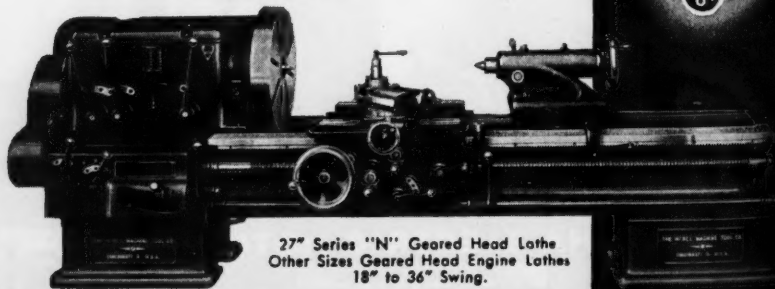
NEBEL Geared Head Lathes

A MODERN LATHE. ALL THE LATEST IMPROVEMENTS.

Timken Bearings
Self Oiling Headstock
Chrome Nickel Shafts

Quick Change Gear
Double Wall Self Oiling Apron
Quick Action Apron Levers
Thread Chasing Dial

We also manufacture a line of Removable Block and Extension Bed Gap Lathes.
Write for circulars.

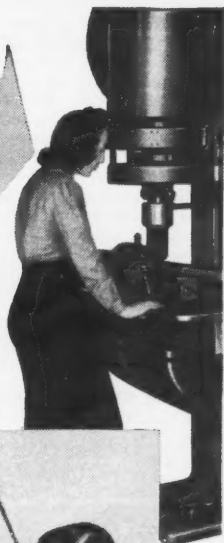


27" Series "N" Geared Head Lathe
Other Sizes Geared Head Engine Lathes
18" to 36" Swing.

The Nebel Machine Tool Co.
CINCINNATI OHIO

HIRED TODAY...

PRODUCING TOMORROW

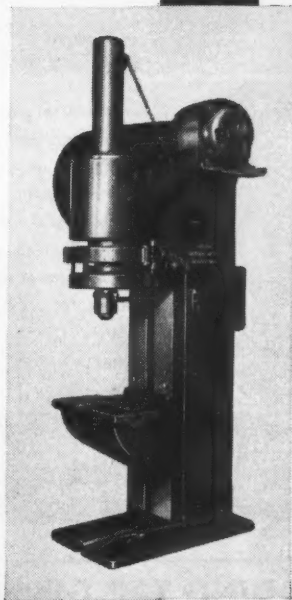


**UNSKILLED HELP QUICKLY TRAINED
TO OPERATE GENERAL FLEXIBLE
POWER PRODUCTION PRESSES**

Learning to operate General Flexible Power Presses in straightening, bending, broaching, forcing, pressing, etc. is very simple. In straightening, for example, it is just a matter of learning where to apply the pressure, and how much—the machine just about takes care of itself.

Foot pedal operated—both hands are free to handle the work. They provide steady pressure—not a snap blow. Pressure is under complete control by the operator.

It's a fast production press—write for Bulletin 376.



GENERAL MANUFACTURING COMPANY

6433 FARNSWORTH AVE. • DETROIT 11, MICH.

GENERAL *Flexible*
POWER PRESS

rotated to the proper angle where they are locked by means of a single thumb-screw. The reference edges of the arms are then used as scribing edges or for aligning parts, as required. The protractor of the instrument is equipped with a vernier, thus enabling the user to read the instrument within minutes of a degree.

The Arcometer is supplied with hardened heads for internal or external application, and with 9-inch bars suitable for internal diameters of from 5 $\frac{1}{4}$ to 16 inches inclusive. Special sizes of the instrument are available on order.

REYNOLDS COOLANT UNITS ARE EFFICIENCY EXPERTS!

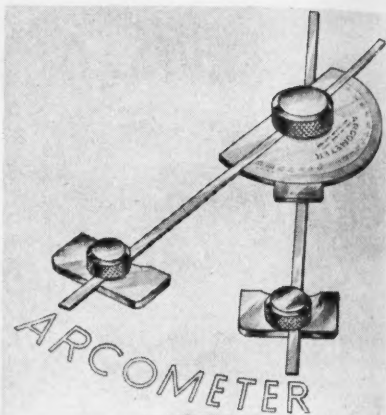


Showing Reynolds No. 1-S attached to milling machine

Designed to promote peak performance in machines using a coolant (cutting or soluble oils), Reynolds Coolant units are the answer to demands for increased production and longer cutting tool life.

REYNOLDS MACHINERY CO.

211 EDDY STREET, PROVIDENCE, R. I.



Arcometer

"Gripmaster" Synthetic Polishing Wheel Cement

Michigan Bleach & Chemical Co., 1944 E. Woodbridge, Detroit 7, Mich., announces a synthetic polishing wheel cement to be known as "Grip-master." Due to a secret high-heat resisting ingredient, the cement, it is claimed, does not glaze on the wheel. Moreover, its unusual adhesive action is said to "lock in" the grains of emery with a positive vise-tight control.

Applicable to all grains—250 to 20—Gripmaster Synthetic Polishing Wheel Cement dries quickly at room temperature, always assuming the contour and shape of the wheel, the manufacturer states. The cement, it is claimed, is completely homogenous, does not settle even after months of standing, and does not have to be stirred in order to use.

READING TAP GRINDER



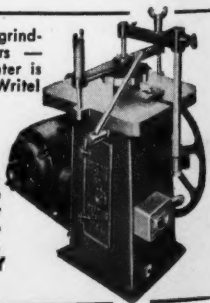
RESHARPEN
DULL TAPS
PROMPT
DELIVERY.

Used on tool and cutter grinders — surface grinders — even bench lathes. Taps sharpened after center is destroyed. No collets. Complete. No extras. Write!

BROACH KEYSEATER

The Reading Bench Machine does not require bushings or guides. Very fast capacity from $\frac{1}{8}$ to $\frac{1}{2}$ cutter. Low first cost.

READING MACHINE COMPANY
READING (CINCINNATI), OHIO



The Sunnen Precision Honing Machine — with New Coolant Pump and Base —

Provides
GREATER HONING SPEED
and ACCURACY

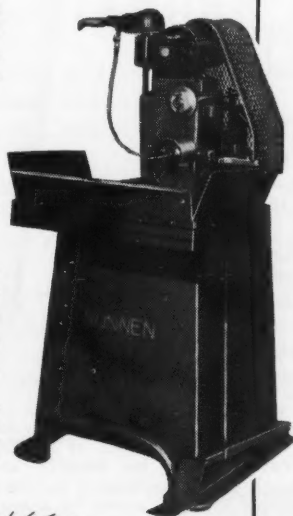
With the addition of a new base that contains a pump for supplying honing fluid, the Sunnen Precision Honing Machine is setting new standards of accuracy. Honing is faster, too. The honing fluid carries away all cuttings, keeps the abrasive stone sharp, and cools the part being honed.

With the Sunnen Precision Honing Machine, accuracy is guaranteed to be within .0001"—and has been held to .000025". A super-smooth finish can be produced. On certain types of metal, a finish of 2 to 3 micro inches can be obtained.

- Hones and finishes cylinders from .185" to 2.625" in diameter
- Can be used in either ferrous or non-ferrous metals—plastics—ceramics, etc.
- Does not require skilled labor
- No jigs or fixtures needed
- Economical to operate
- Can be set up to operate in one minute

Write for a free bulletin giving details about this low-cost honing machine — or ask a Sunnen engineer to show you how it can be used on your jobs.

The coveted Army-Navy "E" waves over the Sunnen plant—evidence of the important part Sunnen equipment is playing in the war effort.



SUNNEN

SUNNEN PRODUCTS COMPANY, 7933 Manchester Avenue, St. Louis 17, Missouri

Canadian Factory: Chatham, Ontario

Typical Jobs



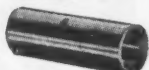
Aircraft Hydraulic Brake Cylinder. Honing 3 times faster than lapping—and gave a straighter hole.



Header Die. Life of header dies increased 3 to 9 times over lapping. Knock out pin breakage practically eliminated.



Aircraft Instrument Panel Control Wire Bushing. Hole .187" diameter—held to .0002" stock removal .001", sixty per hour.



Aircraft Piston Pin. Sunnen honing is twice as fast and gives a cleaner, better looking pin.



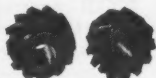
Stainless Steel Load Compensator Valve Seat. Hole is honed to .0002" limit.



Aircraft Valve Tappet Roller. Honed after grinding to give 100% bearing surface.



Aircraft Carburetor Operating Valve Sleeve. Sunnen honing eliminates distortion from assembling operation.



Automobile Distributor Shaft Gears. Taper removed at a rate of 80-90 per hour.



Roller Bearing Outer Race. Finish improved from 12 micro-inches to 2 micro-inches.



Bearing. A very small part. 2 micro-inch finish necessary.



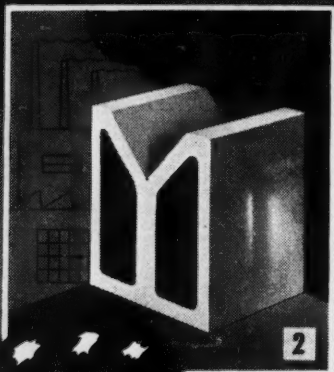
Carburetor Idler Valve Jet. Hole is honed after reaming for smooth action.



Shell Loading Die.

CHALLENGE

SURFACE PLATE EQUIPMENT



Masterpieces

OF

PRECISION

2 "V" BLOCKS

FOR supporting shafts and other cylindrical work when drilling, checking, inspecting, etc. Made from fine-grained, special analysis semi-steel castings, precision ground to the required accuracy.

Speed up accurate alignment and machine work with these handy blocks.

Write for data and prices.

Other Surface Plate Equipment

- | | |
|------------------------------|------------------------------------|
| ★ Box Parallels—
18 sizes | ★ Universal Angle
Irons—4 sizes |
| ★ Angle Plates—
22 sizes | ★ Solid Parallels—
14 sizes 495 |

Buy More



War Bonds!

THE CHALLENGE MACHINERY CO.

GRAND HAVEN

MICHIGAN

Duo-Safety Series "G" Folding Ladder

Known as the Series "G," a heavy-duty, lightweight folding ladder for overhead jobs of all types is announced



Duo-Safety Series "G" Folding Ladder

by the Duo-Safety Ladder Corp., Oshkosh, Wis. Easy to handle since it can be readily folded into a bundle 3x3 feet, the ladder is equipped with shoes to assure maximum safety while working on all types of surfaces. A special lock provided is said to hold the ladder absolutely rigid in the open position.

lding

heavy-
ter for
nounced

Special to Tool Room Foremen



This is just the shop tool that you have been wishing for—
It's a diamond tipped tool to dress any grinding wheel—
up to 8 inch—that cuts cleaner, lasts longer and needs
no resetting.
This tool is the popular

MEINHARDT DIAMOND TOOL No. 2S

Diamonds set by skilled artisans with the Meinhardt cool temperature
process are tighter and last much longer.
Tools are $7/16$ " by $3\frac{1}{2}$ " nib or $3/8$ " by $2\frac{1}{2}$ " nib.

PROVE THE SUPERIORITY OF THE MEINHARDT
2S IN YOUR OWN SHOP UNDER OUR MONEY-
BACK GUARANTEE ON A DOZEN ORDERS.

Order 1 dozen (either size or assorted) at the special guarantee
offer price of \$36 per dozen. Use 1 tool. If it doesn't meet your
severe demands better—send all the tools back and we will
refund all your money.

This offer good only to March 1st.

MEINHARDT DIAMOND TOOL CO. 2810 Milwaukee Ave.
CHICAGO 18, ILL.

January, 1945

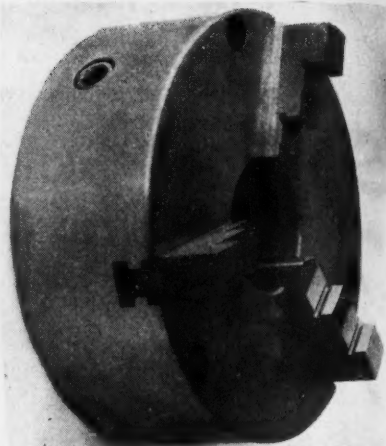
MODERN MACHINE SHOP 267

The Duo-Safety Series G Folding Ladder is available in lengths from 6 to 20 feet, weighing 15 to 48 lbs., respectively, complete with shoes. Closed length of the ladder with shoes ranges from 7 feet 7 inches to 21 feet 7 inches..

Ideal Universal Three-Jaw Chuck

Supplementing its line of machine tool accessories, the Ideal Commutator Dresser Co., 1031 Park Ave., Sycamore, Ill., announces the universal three-jaw chuck shown herewith. Precision made to assure accurate turning, the chuck includes a body of high grade, fine grain, high tensile strength semi-steel. Ample resistance to shock, load, and unusual stress is provided by a rib construction. The scroll is made of alloy steel and is of heavy proportions to assure true turning and long life.

The Ideal Universal Three-Jaw Chuck is furnished with two sets of jaws, one for internal and the other for external work. The jaws are made of specially treated alloy steel to provide durability and strength and can be readily replaced.



Ideal Universal Three-Jaw Chuck

Available in a 5-inch size only, The Ideal Universal Three-Jaw Chuck is furnished complete with a mounting adapter so that the chuck may be accurately fitted to the particular lathe in use.

Rawhide

PROTECTS

The tough, resilient, coiled rawhide faces of C/R Hammers and Mallets strike effective blows without battering or marring... protects finished surfaces, machines delicate insulation and parts. Speed die-setting, assembly, no fatiguing re-coil. Reduce breakage and spoilage. Sizes and weights for every need.

C/R Hammers have permanent malleable iron heads which take replaceable insert faces of coiled mechanical rawhide.

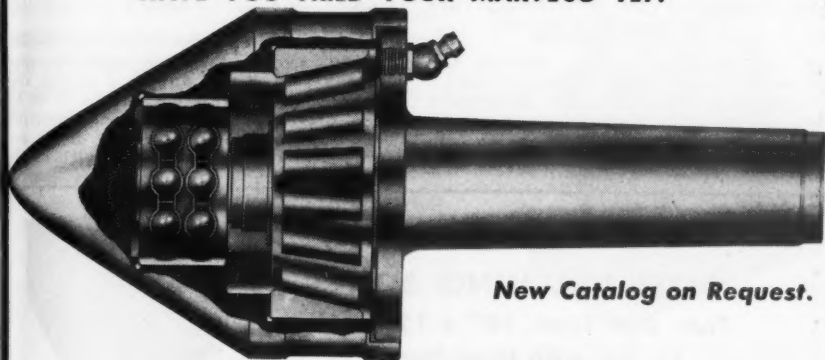
CHICAGO Rawhide MFG. CO.
1201 ELSTON AVE. ★ CHICAGO, ILL.

MARVECO

WE APOLOGIZE

to our customers, both old and new, for our delivery delays of the past few months. We have tripled production four times in the past four years to meet the phenomenal demand for Marvecos, but this was not enough. We are now doubling production again and within the next few weeks better delivery will be assured.

HAVE YOU TRIED YOUR MARVECO YET?



New Catalog on Request.

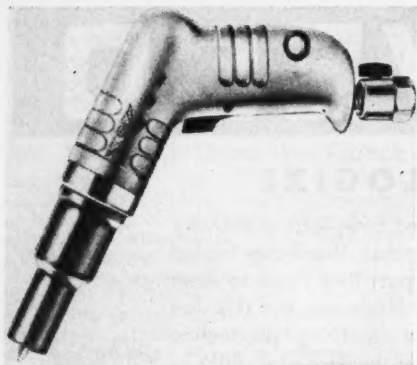
**THE MARVECO is GUARANTEED to
OUTPERFORM and OUTLAST any other
LIVE CENTERS.**

SEND US YOUR CENTER PROBLEMS

**MARVEL TOOL &
MACHINE COMPANY**

Exclusive Manufacturers of MARVECO...THE Live Center

10979 W. JEFFERSON AVE. • RIVER ROUGE 18, MICHIGAN



Aro Model 1011 Impact Screw Driver

Aro Impact Type Screw Drivers and Nut Setters

A line of impact screw drivers and nut setters with positive torque control is announced by The Aro Equipment Corp., Bryan, Ohio. A torque regulator located in the handle of each tool enables the operator to easily regulate

the torque necessary to tighten a screw or nut. Ample adjustment to meet most screw-driving and nut-setting conditions is provided.

Pneumatically powered, the Aro Screw Driver and Nut Setter operate with roller clutch impact mechanisms having four major parts—anvil, hammer, and two cylindrical steel rollers. During the operation of either type tool, centrifugal force causes the two steel rollers to be thrown out against the hammer, thereby transferring the full torque through to the work in the form of a sudden impact. When the selected torque is obtained, the rollers rebound from the anvil face and do not allow the hammer to engage for impact.

The Model 1011 impact screw driver has an aluminum handle and housing, weighs 2 lb. 2 oz., and is 7 inches long overall. It will accommodate Phillips, Reed, and Prince or standard chisel points, bits and finders for slotted screws.

The Model 1012 impact nut setter also has an aluminum handle and housing, weighs 2 lb. 2 oz., and is 7 inches long overall. It is available with a $\frac{3}{8}$ or $\frac{1}{2}$ -inch driver adapter for sockets.

In addition, both the screw driver and nut setter can be furnished with sturdy

We can ship immediately
STEEL STACKING BOXES
Tom Rim Type 18" x 12" x 6".
16 Ga. with Drop Handles
at \$1.27 each



STANDARD SIZES

18 x 12 x 6.....16 Ga.	16 x 10 x 6.....18 Ga.
18 x 12 x 8.....16 Ga.	16 x 10 x 6.....16 Ga.

MADE IN OTHER SIZES



BENCH LEGS

Four sizes. All Welded.
 Olive Green enamel.

BENCH TOPS

Steel and wood with or
 without drawers.

Literature on request.

STERLING
 FACTORY EQUIPMENT CO.

183 CHARLES ST.
 PROVIDENCE, R. I.

The Fastest Production Tool Grinder on the Market*

* Actual statement of a user of several machines.

For all types of tool and cutter sharpening — A real production grinder on which you can sharpen your cutting tools in less time as compared to other methods. Just two simple fixtures needed to handle the general run of cutters.

* * *

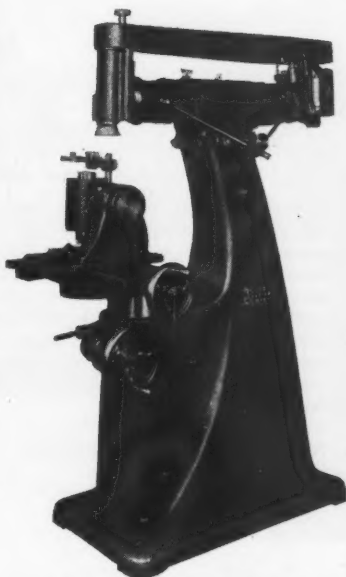
The Ace is easy to set up—fast and simple to operate—operator stands in a comfortable position—clearance by direct reading — radial relief if desired.

* * *

The Ace is doing a BANG UP job for both Cutter Manufacturers and Users. Its many features will appeal to you. Make your next cutter grinder an OLIVER ACE.

**Don't Neglect
Your Toolroom
It's the Backbone
of Production!**

Oliver
OF ADRIAN



Cut illustrates the ACE Universal Tool and Cutter Grinder with Anti-Friction Head—handles a complete range of cutters and tools.

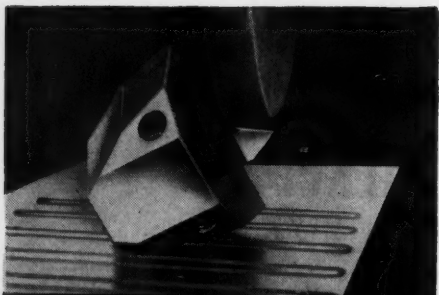
*Send for Literature Today.
Prompt Deliveries.*

OLIVER INSTRUMENT CO.

1430 E. MAUMEE ST.

ADRIAN, MICHIGAN

**AUTOMATIC DRILL GRINDERS — TOOL
AND CUTTER GRINDERS — DRILL
POINT THINNERS — TEMPLATE
TOOL GRINDERS — FACE MILL
GRINDERS — DISMANTLING MACHINES**



GRIND

both 29° and 60°
THREAD TOOL BITS

Accuracy, uniformity, and precision are assured in grinding both Acme 29° and National 60° left or right hand thread-tool bits, with or without rake on the cutting face. No graduated scales or moving parts to wear out. Two sizes, complete with adapters: Model A for the mechanic's tool kit \$16.75... Heavy Duty Model B for the shop \$35.00.



Fixture can be easily clamped to work table when magnetic chuck is not available.

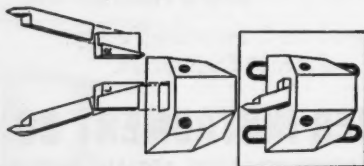


Diagram shows how to grind 15° right and left hand bent tools with standard adapters.

Write for new catalog Dept. MMS-1-GF and call your Clark Cutter Jobber today!

CLARK  CUTTERS

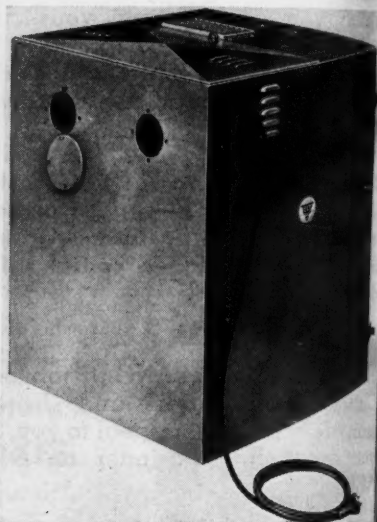
Robert H. Clark Company

9335 SANTA MONICA BOULEVARD • BEVERLY HILLS, CALIFORNIA

plastic handles and housings, reducing the weight of each tool to 1 lb. 13 oz. The tools are supplied complete with 8 feet of $\frac{1}{4}$ -inch hose and fittings.

Delta-Milwaukee Dust Collector

A compact, self-contained dust collecting unit for use in connection with individual machines employed in performing grinding, polishing, buffing,



Delta-Milwaukee Dust Collector

sanding, and similar operations have been added to the line of Delta-Milwaukee products offered by The Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee 1, Wis. The unit includes a powerful fan which sucks both fine and heavy dust and small particles through an efficient air filter. The larger particles fall into a pan at the bottom which can be easily removed.

The filter, according to the manufacturer, is a permanent, cleanable type with low air resistance, and is completely fireproof. A special woven glass filter for use in collecting "flour fine" dust is also available. This filter is attached directly to the standard filter.

The cabinet of the Delta-Milwaukee Dust Collector is of pressed steel and is finished in an attractive shade of

BOYAR-SCHULTZ NEW 618 SURFACE GRINDER

TOOL ROOM PRECISION

WITH HEAVY DUTY

STAMINA

DESIGNED to meet the demand for precision of the most exacting kind in tool and die work and gage grinding, this Surface Grinder is engineered to maintain that high degree of accuracy through long continuous operation.

Specially designed spindle is dynamically balanced and equipped with super-precision, pre-loaded ball bearings and operates at 3,000 R.P.M. It runs smoothly and quietly.

Table of close grained Meehanite moves longitudinally only, and on hardened and ground steel ways—true V and one flat.

New, improved cross feed is designed to move the abrasive across the work in a true horizontal line assuring maximum accuracy.

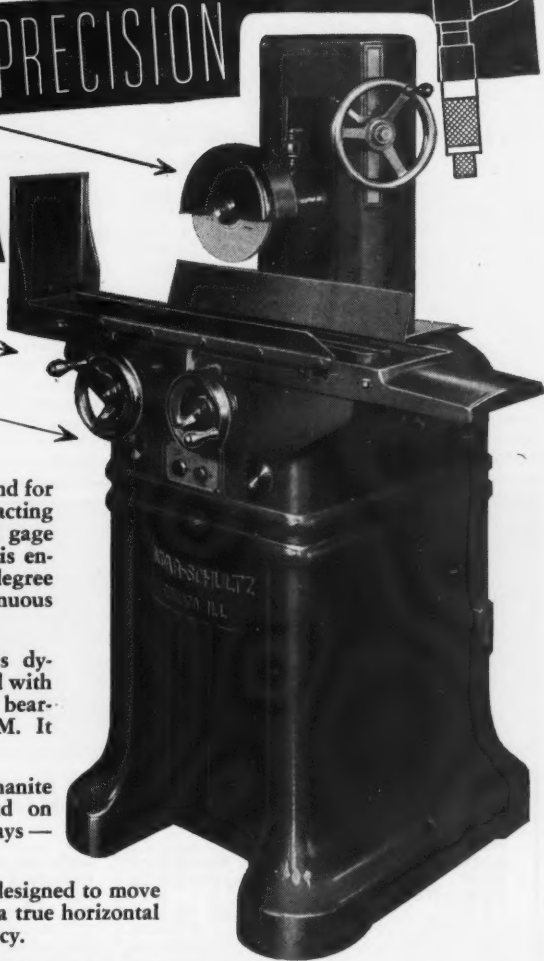
Send for Circular Giving Full Description.

BOYAR-SCHULTZ CORPORATION

120 WALNUT STREET

CHICAGO 12, ILLINOIS

MODERN MACHINE SHOP 273

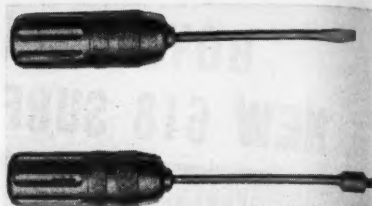


gray. The activating fan is a high-efficiency unit of the squirrel-cage type and is designed to move 350 cubic feet of air per minute, developing a static suction of 3 to 4 inches. Power is furnished by a 1/3 h. p., 3,450 r. p. m. motor, which is provided with sealed-for-life ball bearings and is located in a separate sealed compartment, thus protecting it against harmful dust.

Livermost Roto-Torq Screw and Bolt Driver

Said to completely eliminate all danger of over or under tightening, thread stripping, or material damaging, a torque screw and bolt driver to be known as the Livermost Roto-Torq has been announced by Richmond, Inc., 215 W. Seventh St., Los Angeles, Calif. The driver is 7 3/4 inches long and is provided with a 1.30-inch diameter handle.

The Livermost Roto-Torq Driver may screws, small nuts, bolts, and so on. be adjusted to any torque desired between 1 and 25 inch-pounds for setting. Since the driver is designed to disengage itself at the proper torque, the operator

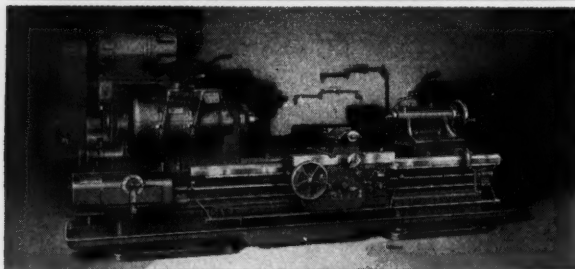


Livermost Roto-Torq Screw and Bolt Drivers

cannot tighten bolt or screw beyond the prescribed fit or tightness, it is stated.

The Livermost Roto-Torq Driver is said to be particularly useful for tightening small screws or self-threading screws which are apt to strip through sheet metal. The torque provided is said to be unaffected by excessive oil or other normal foreign material or by the way the driver is held by the operator.

The Livermost Roto-Torq is available in two models; namely, one with a screw driver as an integral part of the shank, and another with a 1/4-inch square drive. Adjustments may be made from the outside of the handle by an easily read calibrated vernier arrangement.



Engine Lathes

THE BOYE & EMMES MACHINE TOOL CO. CINCINNATI OHIO

BIRMINGHAM.....Pratt & Whitney Co.
BOSTON.....Pratt & Whitney Co.
BUTTE.....Sullivan Valve & Engineering Co.
CHARLESTON, W. VA.,
The McJunkin Supply Co., Inc.
CHICAGO.....P. P. Wagoner, Wilmette
CINCINNATI.....Pratt & Whitney Co.
CLEVELAND.....Pratt & Whitney Co.
DETROIT.....D. E. Morand Machinery Co.
DULUTH.....W. P. & R. S. Mars Co.
GRAND RAPIDS.....Joseph Monahan
HARTFORD.....Pratt & Whitney Co.
HOUSTON.....Huge-Fayle Supply Co.

LOS ANGELES.....Jack Brewer
MILWAUKEE.....Nichol Machinery Co.
NEW ORLEANS. Woodward, Wight & Co., Ltd.
NEW YORK CITY.....Pratt & Whitney Co.
PHILADELPHIA.....Pratt & Whitney Co.
PITTSBURGH.....Rees Machinery Co.
RICHMOND.....D. B. Parker
ROCHESTER.....Pratt & Whitney Co.
SAN FRANCISCO,
Schellenbach Machine & Tool Co.
SEATTLE.....Buckner-Weatherby Co., Inc.
ST. LOUIS.....Pratt & Whitney Co.
TOLEDO.....Frank D. Lake Co.

Indianapolis Machinery Export Co., New York, New York—Export Distributor
Canadian Representative: Moore Bros. Mach'y Co., Ltd., Montreal

WANT INFORMATION ABOUT MARKING?

???

There is a Matthews Marking Device for every industrial marking need! Let us recommend the proper tools to mark your products most efficiently and most economically.

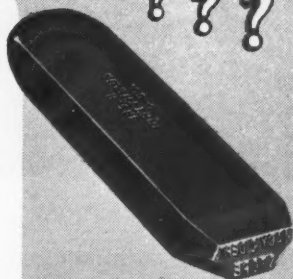
Check items you are interested in:

- ☐ STEEL STAMPS AND DIES
- ☐ MARKING MACHINES
- ☐ INTERCHANGEABLE TYPEHOLDERS
- ☐ STENCIL MASKS
- ☐ METAL CHECKS—BADGES
- ☐ NAME AND IDENTIFICATION PLATES

FOR COMPLETE
DATA

Check This Ad
Attach To Your
Letterhead

And
Return
To



JAS. H. MATTHEWS & CO.

3944 Forbes Street Pittsburgh 13 Pa.

Branch Plants

New York, Boston, Chicago, Philadelphia, Newark, Syracuse

District Sales Offices

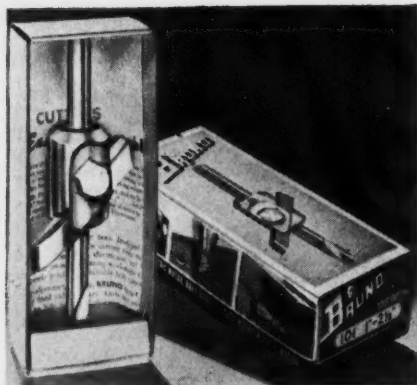
Cleveland

Detroit

Hartford

Birmingham





Bruno Adjustable Hole Cutter

Bruno Adjustable Hole Cutter

An all-purpose adjustable hole-cutting tool for operation in light drill presses, portable drills, or breast drills is announced by Bruno Tools, 9330 Santa Monica Blvd., Beverly Hills, Calif. Also available with square shank to allow

for use in hand braces, the tool can be used in cutting smooth holes in steel, brass, hard rubber, aluminum, fiber, plastic, and other materials.

The Bruno Adjustable Hole Cutter is available in two models. One model is designed to cut holes $\frac{1}{8}$ to $1\frac{1}{4}$ inches in diameter through $\frac{1}{8}$ -inch thick material. The other model can be used in cutting holes from 1 to 2 $\frac{1}{2}$ inches in diameter through materials up to $\frac{1}{2}$ inch thick.

The Bruno Adjustable Hole Cutter consists of a drill which starts the hole and also serves as a pilot for the tool; a hardened body with a milled slot into which is set a specially ground high speed tool bit; and a hardened and ground shank. Adjustment is obtained by loosening a hexagon bolt which holds a firm-locking clip, and sliding the blade to the correct distance from the pilot.

Aeroil "Plast-O-Dip" Tank

Known as the "Plast-O-Dip," an electrically-heated tank for the heating and melting of ethyl-cellulose compounds for the dipping of parts has been designed

DESMOND GRINDING WHEEL DRESSERS



Desmond Hex Dresser



Desmond Heavy-Duty Dresser



Desmond Huntington Dressers

Our Desmond Huntington Cutters are made in all sizes.



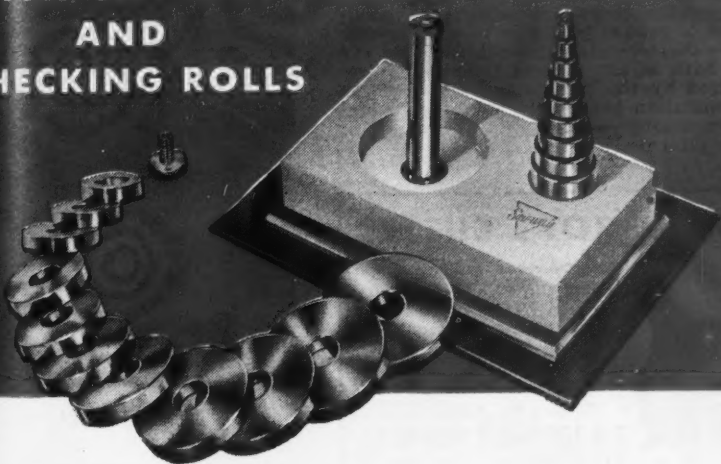
We manufacture only complete line of dressers and cutters on the market, and will be glad to send samples for trial. Write for copy of our new catalog and name of your nearest jobber.



THE DESMOND-STEPHAN MFG. CO
URBANA • OHIO

New Micrometer Accuracy

WITH SAV-WAY MASTER SETTING AND CHECKING ROLLS



Every Mechanic Needs This Set

Every production man knows that precision rolls and inspection devices are only as accurate as the methods and gages by which they are checked and set. When anvils are worn unevenly, flat gage blocks may not be adequate. This Sav-Way set of Master Setting and Checking Rolls provides for the first time a really accurate means of checking micrometers, and other types of gages under all conditions of wear. The set consists of 20 rolls, ranging from .100" to 2.000" diameter. Rolls are hardened, ground, and lapped to X gage tolerance. The set is housed in a modern, transparent, plastic case.

Sav-Way INDUSTRIES
Products Division

117, HARPER STATION, DETROIT 13, MICHIGAN



A new micrometer instruction book full of valuable technical information will accompany each set.

CLIP THIS COUPON TO YOUR LETTERHEAD

SAV-WAY INDUSTRIES

Box 117, Harper Sta., Detroit 13, Mich.

Please send me illustrated literature on the Master Setting and Checking Rolls.

Name

Street and No.

City

State

by the Aeroll Burner Co., Inc., West New Jersey, New Jersey.

According to the manufacturer, the unit features completely uniform indirect heating through the medium of an agitated hot oil bath that completely surrounds the material. Both tank and removable cover are thoroughly insulated to reduce heat loss to a minimum. Two thermostats automatically hold the oil bath at any desired temperature required by the particular ethyl-cellulose formulation being used. A built-in dial thermometer permits easy checking of the oil bath temperature.

WIRE ROPE CUTTER



Hand Operated • Lever Action
Will Cut 1" and Smaller
Wire Rope.

A compact, handy machine
built for endurance.

Price \$80.00 Weight 110 lbs.

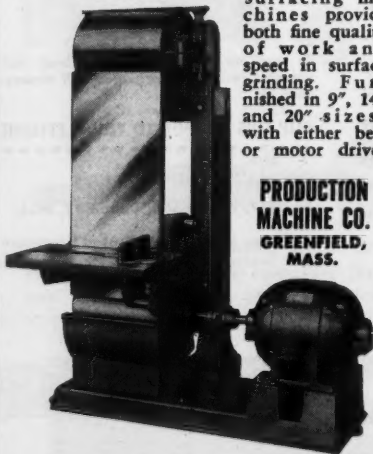
Catalog No. 8 Available.

T. H. LEWTHWAITE MACHINE CO.

No. C

317 E. 47th St., New York 17

Vertical High Speed Abrasive Belt PEERLESS Surfacers



•Peerless vertical
surfacing
machines provide
both fine quality
of work and
speed in surface
grinding. Fur-
nished in 9", 14"
and 20" sizes,
with either belt
or motor drive.

**PRODUCTION
MACHINE CO.
GREENFIELD,
MASS.**



Aeroll "Plast-O-Dip" Tank

Available for operation on either 110 or 220 volts, alternating current, the Aeroll Plast-O-Dip Tank utilizes two 4.5 kw. heating elements having liquid proof covers and heating coils sealed within steel blades. The tank has a dipping space of 25 inches long x 12 inches wide x 12 inches deep. A heater removable dividing partition permits the addition of cold compound during dipping operations without adverse effect on the temperature of the molten plastic.

Taft-Peirce Wheel Balancing Stand

A stand for use in balancing surface grinding wheels up to 7 inches

**GOOD MACHINE TOOLS
INSURE PERFECT RESULTS
AND TOP PRODUCTION**

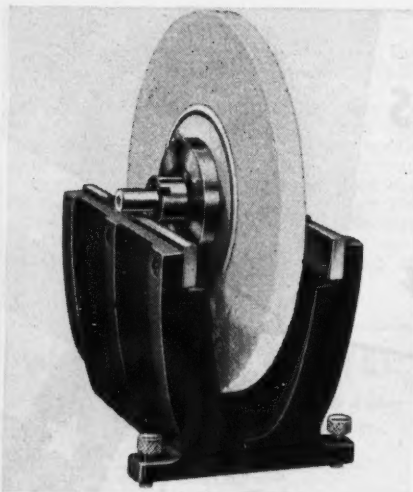
Specify "QUALITY" H. S. Woodruff
Keyway Cutters When You Have a
Tough Job To Lick

QUALITY TOOL WORKS
WAUKEGAN

Spartan Blades lend a hand to Industry

SPARTAN
KUTALL

● Spartan Hack Saw Blades are lending a helping hand to industry's battle of production. They're armed to the teeth to help industry slap the Jap off the map. Spartan Kutall Blades are made of Molybdenum Special Alloy High Speed Steel, are heat-treated by the special Spartan process, and are fast and tough. Spartan offers five special types of Hack Saw Blades, also Band Saws. See your distributor today.



Taft-Peirce Wheel Balancing Stand

diameter has been placed on the market by The Taft-Peirce Manufacturing Co., Woonsocket, R. I. The stand consists

of a cast iron base having two hardened rails on which the balancing arbor may roll freely to indicate the balance of the mounted wheel.

Enco Series CR Turret Tool Post

Enco Manufacturing Co., Dept. 22, 4522-24 Fullerton Ave., Chicago 30, Ill. announces a compound replacement turret tool post designated as the Series CR. The tool post is especially designed for engine and bench lathes with low center heights (the distance from the top of the compound rest to the center line of the spindle), and is available in four models, designated as the CR-6, CR-4½, and CR-3½, for tools up to 1½, 1¼, ¾, and ½ inch respectively. It is recommended for use on lathes having swings from 9 to 36 inches.

The turret block is provided with indexing positions spaced 30 deg. apart, thus enabling each of the four tool mounted in the block to be used in performing more than one operation. The facing tool, for example, may be used for turning by indexing the tool to the next position. In this manner, standard and ground tools, including angular

ROD GRINDING

Straight Rods 1/32" to 1/2" Diameter
Diam. Tol. .0005 on Rods Up to 6' Long
Diam. Tol. .001 on Rods Up to 12' Long

13 YEARS OF
CENTERLESS GRINDING SERVICE

QUICK DELIVERY

SMALL
PRECISION PINS
MADE TO
CUSTOMER'S
BLUE PRINTS
... STRAIGHT ...
... DOWEL ...
... TAPER.

HIGH QUALITY

COMMERCIAL CENTERLESS GRINDING CO.

6605 CEDAR AVE. Phone: ENdicott 3412 CLEVELAND 3, OHIO

two hard
ancing abou
he balance

ool Post

Dept. 22
go 39, Ill.
ement turn
the Serie
ly designe
with lov
from the
the center
s availab
the CR-
or tools u
respectivel
on latho
nches.
ed with
deg. apar
four tool
sed in pe
eration.
ay be use
tool to th
ner, stand
g angula

INS

S
S
...
..

ALITY

G CO.

OHIO

January, 1945

For a Prosperous Peacetime America...

BE READY WHEN RECONVERSION COMES!

WORKING has always been one of industry's major problems. When peace returns, this may well be one of the real bottlenecks at a time when the Nation's greatest need is maximum employment in civilian production.

May we earnestly suggest that consideration be given to the future retooling needs of YOUR PLANT. We invite you to get acquainted with us now—so that we may be in a position

to provide speedy assistance when this problem arises.

Investigation will show you that we are competent and equipped to give you a COMPLETE service of engineering and production on any type of special tool problem, and to COMPLETELY TOOL UP YOUR PLANT.

The same "Know How" and pioneering spirit which enabled us to successfully accomplish the mass production of precision inspection gages

for War, will be used to engineer maximum production capacity into the tools of Peace.

For information, without obligation, write to us at the address below.

Stay with It... Buy War Bonds

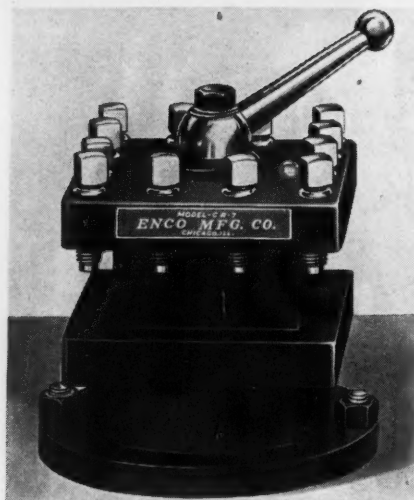


QUALITY TOOL & DIE CO.

Manufacturers of "Quality" Products

111 NORTH NOBLE STREET, INDIANAPOLIS 2, INDIANA





Enco Model CR-7 Turret Tool Post

tools, may be used without special re-grinding.

Rigidly constructed to eliminate chat-

ter in performing cutting operations at high speeds, the Series CR Turret Tool Post is supplied ready for use.

J & L Roller Turner Tools

The addition to its standard stock tool line of a series of cemented carbide-tipped tools designed for Jones & Lamson roller turners has been announced by the Carboloy Co., Inc., 1114 E. Eight Mile Ave., Detroit 32, Michigan.

The J & L Roller Turner Tools range in size from $\frac{3}{8}$ x $\frac{1}{2}$ -inch shank to 1 x $1\frac{1}{4}$ -inch shank. The tools are regularly furnished with tips of 78B steel cutting grade of Carboloy cemented carbide and are designed for J & L roller turners Nos. TX536, 537, 805, 813, 863, 873, 875, 876, and 1013.

Hall Collet Chuck

Designed to completely eliminate latches, fingers, cams, dogs, and bolts, a collet chuck or simple design which allows for instantaneous locking

MEASURING A PLUG GAGE with LIGHT WAVES

using an optical flat, a toolmaker's flat and a gage block

The formula is:

$$D = h + \frac{(.000012 \times N \times W)}{W}$$

Substitute the actual values

$$D = .750 + \frac{(.000012 \times 3\frac{1}{2} \times 1\frac{1}{16})}{\frac{1}{16}}$$

and get the answer

$$D = .750168 \text{ inch.}$$

It's just that simple!

Write for new, free Lightwave Measurement Booklet.



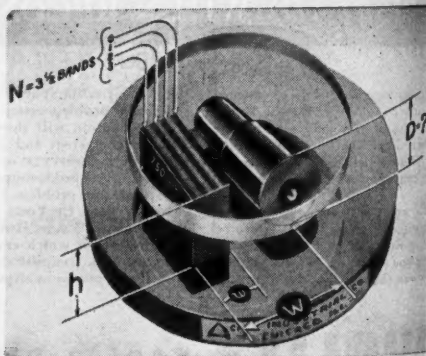
ACME INDUSTRIAL COMPANY

Makers of Standardized Jig and Fixture Bushings

212 N. Laflin St.

Chicago, Ill.

MONroe 4122



UTICA TOOLS

For More Tool Mileage

THE Finest Pliers and Wrenches for lasting service.



The choice of good mechanics everywhere.



UTICA DROP FORGE
AND TOOL CORPORATION
UTICA, N. Y.

WITH MASTER PLATES

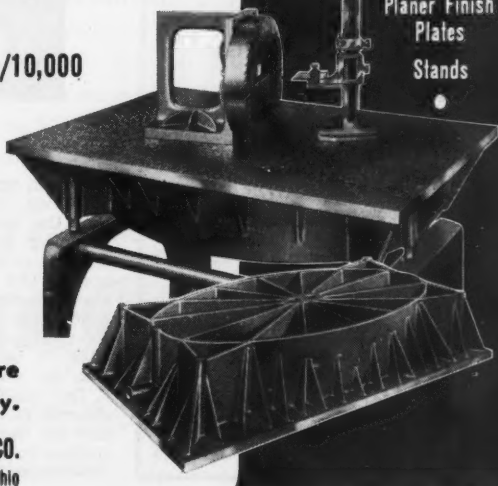
Exclusive Elliptical Reinforced Rib Design

Maximum Rigidity

Precision Accuracy to 1/10,000

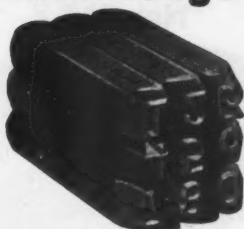
You can best meet the demands for greater accuracy in production inspection with Master Surface Plates. Available in a wide range of sizes from 8x12 to 36x68 inches. Our deliveries are now being made promptly.

UTICA TOOL & ENGINEERING CO.
100 N. Sandusky Ave., Bucyrus, Ohio



• Surface Plates
• Lapping Plates
• Planer Finish Plates
• Stands
•

Why THOR STAMPS Last Longer



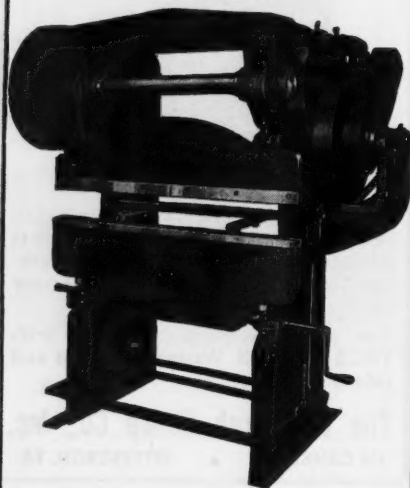
... because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

The Pittsburgh Stamp Co., Inc.
812 CANAL ST. • PITTSBURGH, PA.

CHICAGO STEEL PRESS

No. 253



SPEED WAR PRODUCTION OF SHEET METAL WORK

USE FOR...

1. FORMING
2. EMBOSHING
3. MULTIPLE PIERCING
4. NOTCHING
5. BLANKING

of Ammunition Cases, Bomb Box Liners,
Bomb Fins, Aircraft Parts and Many
Other Offense Products.

The No. 253 CHICAGO STEEL PRESS
is accurate, compact, and ruggedly
constructed of highest quality materials.
Sizes 4, 5 and 6 ft. capacities up to 10
gauge.

Write for Circular No. 255

**DREIS & KRUMP MFG.
Company**

7418 LOOMIS BLVD.

CHICAGO 36

ILLINOIS

or releasing of work without stopping
the lathe is now being offered by the
Hall Manufacturing Co., 622 Tularosa
Dr., Los Angeles 26, Calif. Available
in 1 and 2-inch sizes, the chuck pro-
vides a full spindle capacity and auto-
matically adjusts itself to variations in
the diameter of the bar stock.

With the Hall Collet Chuck, the bar
stock is "pushed out" against the stop
so that length is always accurate. The



Hall Collet Chuck

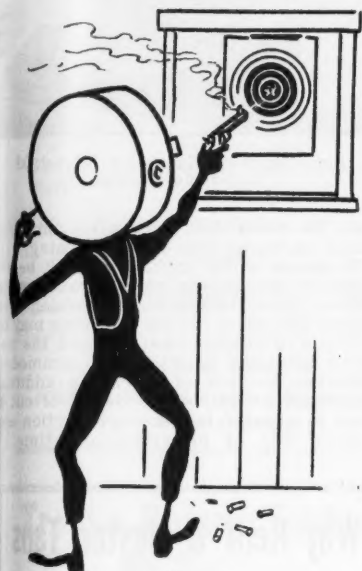
powerful grip which holds the stock
built up through compound leverage
and the collets used provide maximum
gripping surfaces, thus materially re-
ducing accumulated distortions at the
end of the work. The chuck includes a
short locking lever which allows for
quick and easy locking or releasing of
the bar stock. Friction and heat are
said to be eliminated due to the fact
that all parts rotate at spindle speed.

The Hall Collet Chuck is designed to
extend only 2 inches beyond the spin-
dle in the 1-inch model and only 2 1/2
inches in the 2-inch model. This short
extension provides for unusual chuck

TEST A WESTCOTT

.. against *any* Chuck you are using
for

ACCURACY



Accuracy is *engineered* into Westcotts. For example, the Westcott Universal centers to .003" or less, total indicator reading, when new. Special alloy scrolls and other sturdy precision parts insure a high degree of accuracy for the active life of the chuck. Accuracy means faster production, fewer rejects. That's why we say—TEST A WESTCOTT.

WESTCOTT—Precision manufacturers since 1872.

WESTCOTT

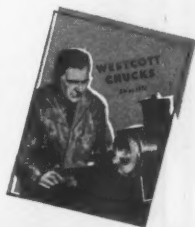
Chucks

PRECISION • DEPENDABILITY • SERVICE

SEND

for Catalog 600.

Westcott Chuck Co.,
720 E. Walnut St.
Oneida, N. Y.

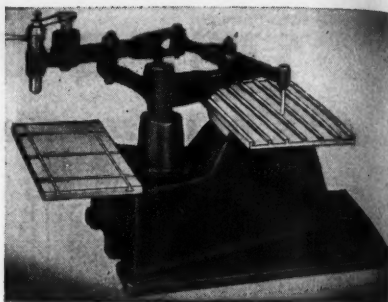


rigidity and enables extra heavy form cutting operations to be performed. The smaller size is supplied with an adapter nut which enables the chuck to be mounted on any standard model lathe, while the larger size is furnished equipped with a blank adapter nut so that the user may cut it to fit any type of lathe—standard or special—with up to full 3-inch diameter spindle.

Auto-Engraver "Super-Cut" Model D2 Engraving Machine

Letters, numerals, designs, emblems, and signatures are said to be readily reproduced by means of the "Super-Cut" Model D2 Engraving Machine now being offered by the Auto-Engraver Co., 1776 Broadway, New York 19, N. Y. Letters and numerals are engraved from master type furnished with the machine. Designs, emblems, and signatures can be easily traced from the original drawing on paper or from master templates.

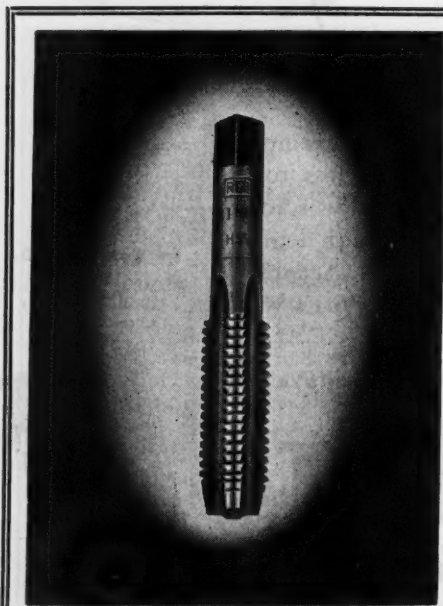
By using a master plate, a series of holes can be accurately drilled with the Super-Cut Model D2. The machine can



Auto-Engraver "Super-Cut" Model D2 Engraving Machine

also be used for accurately profiling small parts, as well as for etching.

Progress while engraving may be accurately checked by simply rotating the stylus arm without disturbing the work. The setup of the machine may be easily and quickly changed and the machine adjusted at will to accommodate different heights of work. In addition, micrometer control for depth of cut is said to greatly increase production and reduce loss of materials and time.



Why Reiff & Nestor Taps

Every successful business must have enduring friendships, loyalties that are beyond price and associations that help to make success.

With these essentials plus a modern plant and thirty-two years of fine tool making R&N Taps have survived the severe tests of accuracy and durability in the Aviation, Gun, Tank and delicate instrument industries that are making weapons of War. Also they are making a host of new friends we will serve after Peace comes.

Reiff & Nestor Taps are veterans of the "World's Toughest Proving Ground."

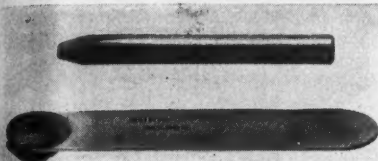
REIFF & NESTOR COMPANY

...Manufacturers...

LYKENS

PENNSYLVANIA

'BURR-OFF'



For Removing Burr or Chamfering
Holes and Slots of Fork-Shaped
Parts.

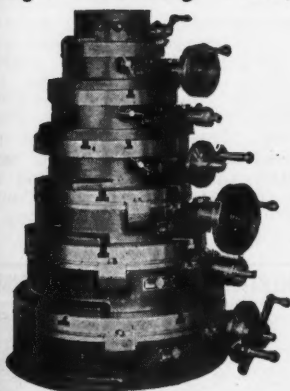
**EFFICIENT • DURABLE • SIMPLE
INEXPENSIVE**

TOOL IMPROVEMENTS CO., INC.
SEAFORD, NEW YORK

General Sales Agents:

JOHN H. GRAHAM AND CO., INC.
105 Duane St., New York, N. Y.

Troyke Rotary Tables



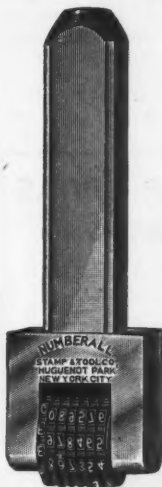
Sizes 9", 12", 15", 18"

Ask your dealer or write us for
eight page catalog.

ALFRED A. TROYKE
4422 Appleton St. Cincinnati, Ohio

NUMBERALL

Multi-Wheel Numbering Machine Model 70



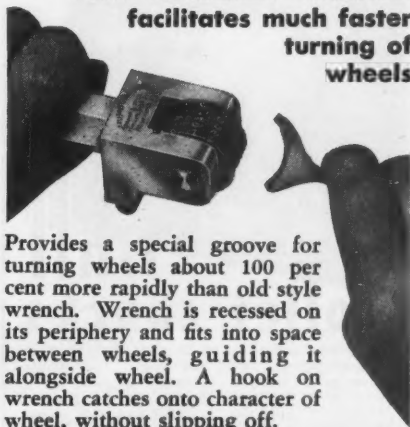
The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

*Write for
Bulletin MS-70.*

Model No. 70

New SPANNER WRENCH

**facilitates much faster
turning of
wheels**



Provides a special groove for turning wheels about 100 per cent more rapidly than old style wrench. Wrench is recessed on its periphery and fits into space between wheels, guiding it alongside wheel. A hook on wrench catches onto character of wheel, without slipping off.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

Greaves Reamer Driver

A reamer driver of streamlined, fully enclosed, compact design is announced by The Greaves Machine Tool Co., 2015-3 Eastern Ave., Cincinnati, Ohio. Easy to operate, the unit includes a 4-inch four-jaw universal chuck and a foot switch for controlling the motor, thus allowing the operator free use of both hands to handle the work. It is equipped throughout with bronze bearings, and the gears of the unit operate in oil.

The Greaves Reamer Driver has four speeds of 30, 45, 72, and 115 r. p. m.



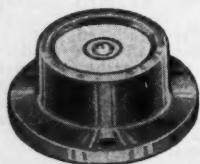
Greaves Reamer Driver

Units with higher speed ranges are available upon special order. The driver has a capacity for $\frac{1}{4}$ to $1\frac{1}{2}$ -inch reamers and is powered by a $\frac{1}{3}$ h. p., 110/220-volt, 1725 r. p. m., a. c. motor. The unit is 14 inches long x $12\frac{1}{2}$ inches wide x 8 $\frac{3}{4}$ inches high and weighs 110 pounds.

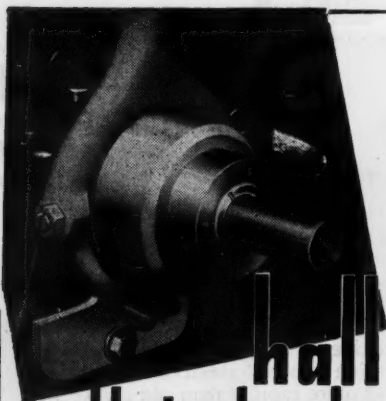
G&B CIRCULAR LEVELS

Indicate in All Directions

Send for
Folder.



Geier & Bluhm, Inc.
River & North Sts.
TROY, N. Y.



hall
collet chucks

All grip—no slip . . . no bearings, friction, heat or lost power . . . push out type . . . full spindle capacity or over . . . automatic adjustment . . . work re-set without stopping lathe . . . 2 sizes, 1" and 2" capacities . . . order now with proper priorities.

Immediate deliveries.

HALL MANUFACTURING COMPANY

Ph. NO 9679

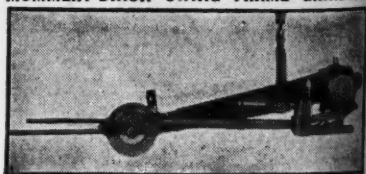
622 Tularosa Dr.

Los Angeles 26, Cal.

Strong Multi-Purpose Grinding Attachment

A multi-purpose grinding attachment which can be readily installed on surface grinders, thus greatly increasing the utility of such machines, is announced by the Strong Manufacturing Co., 5312 Westminister Ave., Philadelphia, Pa. The model shown in the accompanying illustration has a capacity for work up to 6 inches long and 6 inches in diameter. The attachment is also available in a model having a ca-

MUMMERT-DIXON SWING FRAME GRINDERS



Sizes 12", 14", 16", 18", 20" and 24" wheels.

Ask for Descriptive Circular

MUMMERT-DIXON CO.

120 Philadelphia St.

Hanover, Pa.

Setting New Standards for..

FOR STANDARD AND
SPECIAL TOOLS MADE
TO YOUR BLUEPRINTS

- ✓ SPEED
- ✓ PRECISION
- ✓ FINISH
- ✓ LONG LIFE

TELEPHONE • LEXINGTON 5380

ARCHER & SMITH

LIMITED

Carbide Cutting Tools HI-SPEED

125 NORTH EASTERN AVENUE LEXINGTON 34, KENTUCKY

With every modern facility for precision production on small and big jobs—standard or special—Carbide or Hi-Speed—with the "know how" bond of years of experience—with a reputation for service and attention to details, Archer & Smith invites your inquiry—and pledges action. Write for catalog. Send blueprints.



ARCHER & SMITH, LTD.
125 NORTH EASTERN AVE.
LEXINGTON 34, KENTUCKY

Please send latest Cutting Tool catalog. ☐ Blueprints of special tools we require are enclosed; or ☐ mailed under separate cover.

Name.....Title.....

Firm Name.....

Address.....

City.....State.....

ages are
he driver
ch ream-
3 h. p.
e. motor.
1/2 inches
eighs 118

inding

achment
on sur-
increasing
is an-
facturing
Philadel-
in the ac-
capacity
g and 6
hment is
ng a ca-

GRINDERS

" wheel
O.
over, Pa.

January, 1945



Showing the Tilting of the **STRONG** Attachment

Strong Multi-Purpose Grinding Attachment Mounted on a Surface Grinder

angles can be cut in two directions on the workpiece without removing it in order to obtain right and left-hand pitches.

The Strong Multi-Purpose Grinding Attachment can be used in performing shoulder grinding operations on cylindrical parts, circular form tools, a precision indexing fixture for the purpose of grinding flats, squares, hexagons, rectangles, octagons, and so on. This feature is said to be particularly useful in the production of broaches, grinding reliefs on taps and reamers, and other work.

capacity for work up to 10 inches long and 8 inches in diameter.

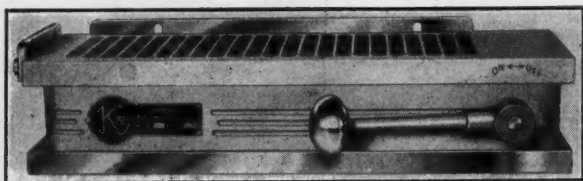
A motor causes the work to rotate, and the attachment may be tilted forward or backward, providing any desired angle. The general angle desired is set by hand, with the exact angle obtained by means of a precision vernier adjustment. Since the attachment can be tilted either backward or forward,

duction of broaches, grinding reliefs on taps and reamers, and other work.

Quaker "Microcut" Soluble Cutting Oil Bases

Quaker Chemical Products Corp., Conshohocken, Pa., has announced the se-

KAR Permanent Magnet CHUCKS



Cannot Fail
Hold Work Tight
Generate No Heat

An outstanding and exclusive advantage of the KAR Permanent Magnet Chuck is its ability to hold smaller pieces securely due to the close spacing of the pole pieces.

Release Easily
Used Wet or Dry
Use No Power



THE KAR ENGINEERING CO., Inc.
GREAT BARRINGTON MASSACHUSETTS

ending At-
Surfaces

two di-
orkpiece
in order
eft-hand

Purpose
t can be
shoulder
on cylin-
ar form
exing fix-
of grind-
exagons,
, and so
aid to be
the pro-
leliefs on
ork.

uble

s Corp.
d the se-

asily

er Dry

ower

INC.
CHUSSETTS

January, 1945



BAUMBACH

STANDARDIZED

DIE SETS

Machined Steel Semi-Steel

Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

Send for Our New Catalog

E. A. BAUMBACH MFG. CO.
1806 S. Kilbourne Ave. Chicago, Ill.


**MARK
IRON,
STEEL
and
CARBIDES**

**THE
Etchograph**
Trade Mark

WAY

Original Electric Etcher. 3000 in Daily Use
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements. • Also a combined Etchograph and Demagnetizer.
• Write for circulars and prices.

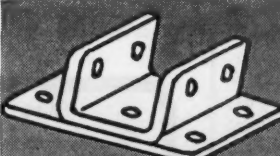
BREWSTER-SQUIRES CO.
Hudson Terminal Bldg. New York 7, N. Y.




18 WAYS TO SAVE TIME & MONEY with the MEAD Industrial Burring Machine

New circular explains, illustrates 18 ways in which the Mead Industrial Burring Machine saves time and money—also contains special Grit Guide. Every industrial plant needs this "Jack-Of-All-Trades" machine. Your burring can be done in "free time"—install these machines by every machine tool which leaves burrs. Grinds, finishes both outside and inside cut-out openings. Immediate delivery in most cases. Write for the informative Money-Saving circular now.


Mead Specialties Co.
Dept. A-145
13 S. Market St.
CHICAGO 6, ILL.



Formed Stamping
Round Off Corners. Remove Tapping Burrs



Die Cast Spider
Clean Out Flash in Corners



Screw Machine Cam
Grind Edges to Smooth Fair Curves



For METAL—PLASTIC—WOOD

lection of the trade name "Microcut" for its line of soluble cutting oil bases formerly known as "Tool Kool" and designated as Tool Kool 1, Tool Kool 20, and so on. The numbers such as 1 and 20 will be used as heretofore to designate the various types.

Young Expanding Mandrel

Said to require no wrenches, washers, or power-operated drawbars, a mandrel which provides for the automatic locking of work placed thereon has been



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.



Young Expanding Mandrel

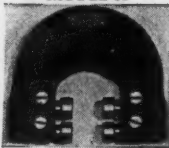
well as turning and grinding operations is said to maintain concentricity over the entire length of the work.

The design of the Young Mandrel includes a sleeve which is claimed to protect the work from damage, nicks, or mars, and eliminate any tendency to "cloverleaf." According to the manufacturer, the mandrel cannot be sprung or distorted under normal use and will absorb several thousandths inch variation in bore diameter.

JOHNSON'S



MODEL A



MODEL B



MODEL C

W. E. JOHNSON CO.

Adjustable Limit Snap Gages

Keep down your gage costs by using these fast, accurate gages. Reset when necessary. Also: Flat and Cylindrical Plug Gages, Built-Up and Solid Snap Gages, Flush Pin and many other types of gages.

WRITE
FOR
DETAILS.

Factory:
**Turnpike and Pequannock
Avenue
Pequannock, N. J.**

Ruthman Model HL-15025-B "Gusher" Coolant Pump

In response to machine tool requirements for greater tank capacity and utility of floor space, The Ruthman Machinery Co., 1817 Reading Rd., Cincinnati 2, Ohio, has added a deep immersion type coolant pump designated

For
*Fast, Accurate
Metal-Cutting
Use*



KENAMETAL CEMENTED CARBIDE
TOOLS, BLANKS, and MILLING CUTTERS



KENAMETAL Inc.

LATROBE, PA.

erbor Co.
Heights,
y be used
ishing as



el

operations
ricity over
andrel in-
ed to pro-
nicks, or
ndency to
manufac-
sprung or
and will ab-
variation

5025-B
ump

ol require
oacity and
Ruthman
Rd., Cin-
a deep im-
designated



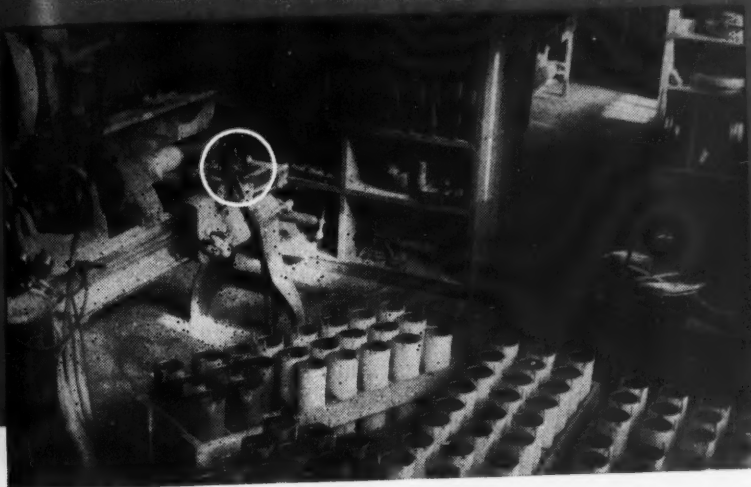
EMENTED
CARBIDE
CUTTERS

Ino.

January, 1945

EVEN PAPER

and other non-metallic surfaces...



THOUSANDS of these pressed paper tubes are now being sprayed with zinc for electrical purposes. A fast METCO Type 3E Metallizing Gun and an old lathe provide a simple production set-up that cuts application costs to the bone. If metal coatings on *any* non-metallic base are what your products need, then METCO can help.

METCO

**WORLD'S FINEST
METALLIZING EQUIPMENT**

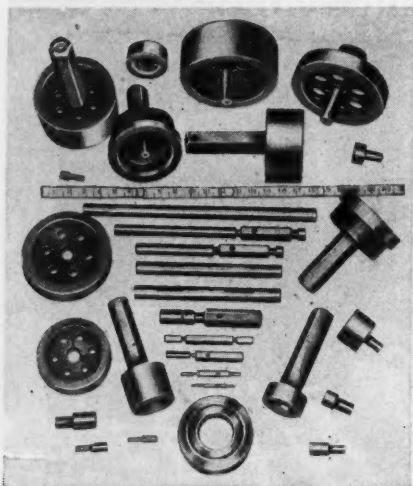
COUPON GETS COMPLETE INFORMATION

METALLIZING ENGINEERING CO., INC.
38-22 30TH STREET, LONG ISLAND CITY 1, N. Y.
Write for Bulletin 46, describing the new Type 3E Gun and its uses.

Name _____
Title _____
Company _____
Address _____

MMS. 1/45

GAGES



In 48 Hours

(IN MANY SIZES)

Plug Gages, Ring Gages, Snap Gages (Adjustable and Solid) Built-up Gages, Flush-Pin Gages, Special Gages.

Our Good Gages:

**Prevent Spoilage, Utilize Less Skilled Help
Speed-Up Operations, Reduce Costs**

EASTERN PRECISION GAGE CO.

318 Bayway

Elizabeth 2, N. J.

We operate day-and-night and Sunday
Phone us at any hour
ELIZABETH 2-9519

Send for illustrated folder—M

as the Model HL-15025-B to its "Gusher" line of pumps.

The pump is available in two lengths of 19 and 23 inches immersion below the high level line of the coolant reservoir. The mounting bracket is of a circular flange type, 10½ inches in diameter, and is an integral part of the unit, thereby facilitating installation. The entire rotating mechanism is located on a one-piece extended steel shaft which is electronically balanced after assembly and mounted in the motor on sturdy precision ball bearings. The pump has no packing glands or metal-to-metal contacts below the high level line, thus eliminating mechanical friction and assuring a generous, adequate flow of coolant with a minimum of power consumption and attention.

The Model HL-15025-B is available with a ¼ h.p. motor for continuous duty and a ½ h.p. motor for extra heavy duty, in standard current characteristics.

Ruthman Model HL-15025-B "Gusher" Coolant Pump



Pratt & Whitney Roll Thread Comparator with Pressure Control

The accompanying illustration shows a roll thread comparator with pressure control which has been introduced by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn. The comparator includes the same type of "go" and "no go" thread rolls used in Pratt & Whitney roll thread snap gages combined with a dial indicator pressure control on both sets of rolls that provides for very close tolerance thread inspection.

As the work is passed between the

"Gush-
lengths
below
t reser-



CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING
& MFG. CO.**

WRITE FOR STOCK LIST

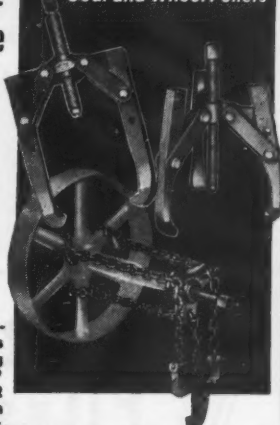
2226 S. CANAL ST.

CHICAGO 16

The Com- plete Line of Gear and Wheel Pullers

Prompt
Delivery

ARMSTRONG-BRAY
Gear and Wheel Pullers



Write for Cat-
alog Sheets
showing
STEELGRIP
Standard 2
and 3 arm
Wheel Pullers,
special Battery Terminal, Pitman Arm, Fan
Pullers and CHAINGRIP Universal Pullers.

ARMSTRONG-BRAY & CO.

"The Belt Lacing People"

5346 Northwest Highway, Chicago 30, U.S.A.

Presenting the Famous

MEAD

AIR CLAMP

Wherever a drill comes
down, something must
hold the work. Wherever
a drilling-jig is required,
Air-Clamp will simplify it.

Wherever speed is desired, *Air-Clamp* will produce it. *Air-Clamp* holds
with relentless pressure; it is undisturbed by size variations (such as in
casing), it scoffs at vibration (how many drills have been broken due to
faulty hold-downs?), chatter, snagging. *Air-Clamp* holds work of any size
or shape in any position, at any angle. Can pay for itself on a single fix-
ture; saves its cost on a few days' drill-press output. Reduces operator fati-
gue. Saves hours and dollars in drafting-room,
jig department, tool room and production line.
Air-Clamp fits any drill-press having a cylindri-
cal column. Special fixtures for Tee-slotted
tables, light milling work, etc. Hand and/or
foot control. Shipped on approval to responsible concerns. Write
for new Air Power Catalog.



Prompt
Shipment!

For
Greater
Drill Press
Output



MEAD SPECIALTIES COMPANY

15 So. Market Street Dept. AA-145 Chicago, 6, U.S.A.

Model HL-
"Gusher"
t Pump

for extra
ent char-

ad Com-
Control

on shows
a pressure
duced by
Niles-Be-
rd, Conn.
same type
rolls used
read snap
indicator
ts of rolls
tolerance

between the

January, 1945

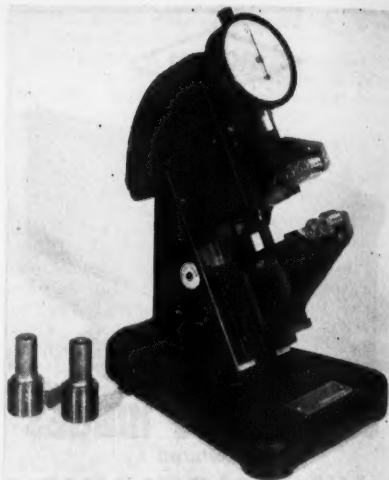
January, 1945

MODERN MACHINE SHOP

295

"go" rolls, any movement of the indicator pointer means an oversize thread. On the other hand, the pointer must move as the work contacts the "no go" rolls if the thread is correct. Lack of movement at the "no go" rolls means oversized work. All "feel" or judgment by the operator is said to be eliminated.

The Pratt & Whitney Roll Thread Comparator consists of a rigid base casting and main frame which carries the indicator bracket. The frame carrying the upper pair of rolls contacts the indicator and is supported by reeds



Pratt & Whitney Roll Thread Comparator with Pressure Control

ROTARY FILES

HAND CUT

CUT TIME

ALL SHAPES Cuts & Sizes

MECHANICAL DIE & TOOL CO. Inc.
11 New York Ave. Brooklyn, N. Y.

which provide for a vertical motion. The lower pair of rolls is supported in a frame which is adjustable on its slide but can be locked solidly in position. A vertical adjustable screw stop holds the two roll frames apart at exact setting with the indicator at zero.

The Pratt & Whitney Roll Thread Comparator is adjustable over a range from $\frac{1}{4}$ to $1\frac{1}{2}$ -inch diameter and utilizes a gaging pressure of approximately 2 lb. The indicator graduations are in 0.0001 inch, thus allowing the gage to be used for classifying if desired.

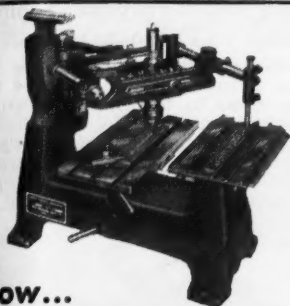
The gage is $12\frac{1}{4}$ inches high and weighs approximately 16 lb. Thread rolls of any desired pitch are available, as well as "go" and "no go" setting plugs for any given thread.

... for more than 1001 odd jobs

HJORTH LATHE & TOOL CO.

WRITE TODAY FOR DATA AND PRICES.

12 BEACON ST., WOBURN, MASS.



Now...

A Heavy-duty Bench-type Engraving & Marking Machine The PANTO Model UE-3

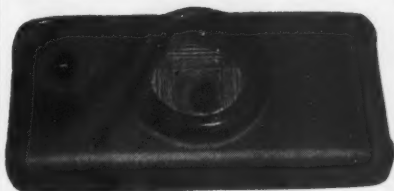
- HEAVIER CUTTING SPINDLE
- FOUR SPINDLE SPEEDS
- MORE PANTOGRAPH REDUCTIONS
- FORMING GUIDE ATTACHMENT

Plus the exclusive Panto feature... Interchangeable heads for engraving, electrical marking, and acid etching.

➤ Write for new Catalog

H. P. PREIS ENGRAVING MACHINE CO.
149A Summit St., Newark 4, New Jersey

"ALL-WAY" LEVEL



The FELL Precision Level is made to show the level of all ways at once. This eliminates disturbing the first level when leveling the second. Graduations are in .0005" per foot and form squares about a circular bubble, thus giving co-ordinate readings and showing direction and amount of slope, if any.

MADE IN TWO SIZES
5 1/2" x 12" 3 1/2" x 6"

Write for Bulletin

W. M. B. FELL CO.

702 SOUTH ST.

ROCKFORD, ILL.

MOTORIZED HOPPER UNITS

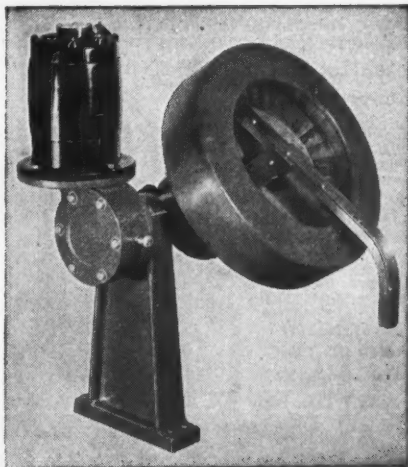
ADAPTABLE TO ANY MACHINE.

FEED BULLET CORES,
SCREWS, PINS, WASHERS,
BEARING ROLLERS, NUTS,
RIVETS, SPECIAL PARTS.

Send Samples for
Information and Prices.

DETROIT POWER SCREWDRIVER CO.

2807 West Fort St.
DETROIT 16 • MICHIGAN





You get versatility

WITH
MARQUETTE
REGISTERED U.S. PAT. OFFICE
A.C. ARC WELDERS

...and that's what you need in the tool and die shop. Big jobs or little jobs... on cast iron, malleable castings, aluminum and practically every weldable metal... hardsurfacing or the heavy cutting of cast iron... MARQUETTE takes them all in its stride, delivering the same fast, low cost, flawless performance that it does in the ordinary welding of sheet metal or heavy steel structures.

That's one of the reasons why a Marquette Welder will cut your costs on all sorts of tools, dies, jigs and fixtures.

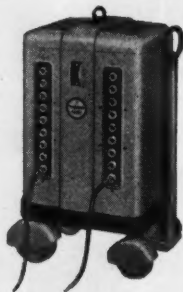
**LOW INITIAL COST —
LOW COST OPERATION
— NEGLIGIBLE UPKEEP
— NO "MAGNETIC
BLOW" — 10 MODELS,
125 TO 400 AMPS.
COMPLETELY EQUIPPED.**

Send for free,
24 page, illustrated
booklet.

**MARQUETTE
MFG. CO., INC.**
Minneapolis 14,
Minn.

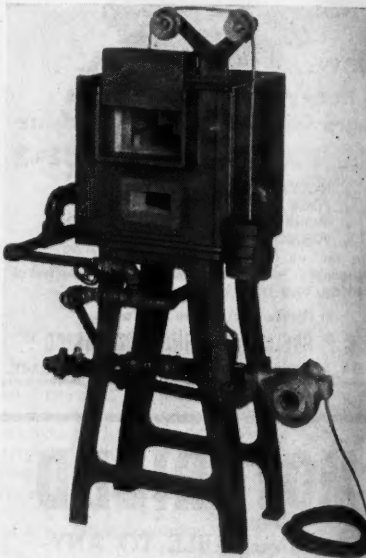
MARQUETTE
REGISTERED U.S. PAT. OFFICE

A.C. ARC WELDERS



Barkling Multi-Purpose Toolroom Furnace

A pedestal type multi-purpose heat-treating furnace which provides three heating areas in the one installation is now being produced by the Barkling Fuel Engineering Co., 400 N. Paulina St., Chicago 22, Ill. The furnace has an indirect heating chamber for hardening, annealing, stress relieving, and



Barkling Multi-Purpose Toolroom Furnace

carburizing, with a door opening 4½ x 8 inches; a direct heating chamber for heating for tool dressing, forging, and bending, with opposed openings of 2 x 4½ inches in the front and back; and a tempering surface on the top for use in tempering tools and dies.

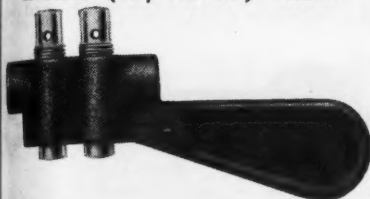
The indirect heating chamber has a U-shaped hearth 6 inches between the ribs and 8 inches deep which can be replaced through the door. The interior is over 410 cubic inches and can be heated to a temperature of 1500 deg. F. in 10 minutes and 1900 deg. F. in 29½ minutes, it is claimed. Temperatures up to 2500 deg. F. can be obtained in the direct heating chamber.

Maintaining of constant heats is made possible by an air relief valve operating in conjunction with a specially designed blower which is said to eliminate

olroom

se heat-
es three
lation is
Barkling
Paulina
ace has
or hard-
ing, and

EDDY ADJUSTABLE INSIDE (GO, NO GO) GAGES



Replace:

—Plug Gages—Size Blocks—Telescoping
Gages—Spring Calipers—Planer Gages—
Keyway Gages.

Each gage is complete in a case with 12
rods of varying lengths to gage all sizes:

between 1" and 2".....	\$26.00
between 2" and 4".....	32.00
between 4" and 6".....	36.00
Set of all 3, 1" to 6".....	85.00

EDDY MANUFACTURING COMPANY

121 PINE STREET

PAWTUCKET, R. I.

EN-G-I-N-E-E-R-E-D To Fit YOUR Product

Over a quarter century we have been
making clutches of all kinds. This clutch
building experience has developed a spec-
ialized engineering service of value to manu-
facturers whose product designs require

special clutch applications. It is a good idea
to use standard clutches, where practical,

but if your need is out of the ordinary, it

will pay you to get the

recommendations of our

power transmission engi-

neers regarding the clutch

which will meet your

specifications exactly.



SEND FOR THIS HANDY BULLETIN ON POWER TRANSMISSION

It shows typical installations
of **ROCKFORD CLUTCHES**
and **POWER TAKE-OFFS**.
Contains diagrams of unique
applications. Furnishes capacity tables,
dimensions and complete specifications.
Every production engineer will find help
in this handy bulletin, when planning
postwar products.



PULLMORE CLUTCHES

**Rockford Drilling
Machine Division**

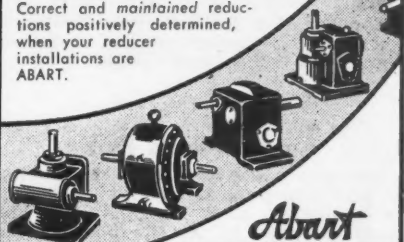
Borg-Warner Corporation
300 Catherine Street, Rockford, Ill.



CLUTCHES

Certainty!

Correct and maintained reduc-
tions positively determined,
when your reducer
installations are
ABART.



Abart SPEED REDUCERS

Compact, Oil-tight. Dust-proof. Over 75
types and sizes. Let us know your needs.

ABART GEARS: Made to specifications
only. No stocks.

Abart **GEAR AND MACHINE CO.**
MANUFACTURERS OF
Speed Reducers & Gears
1000 WESTERN AVENUE, CHICAGO 20, ILLINOIS

m Furnace

opening of
ting cham-
ssing, forg-
osed open-
e front an-
ace on the
is and die-
nber has
etween the
ich can be
The inter-
nd can be
f 1500 de-
deg. F.
Temper-
be obtain-
ber.
eats is ma-
elve opera-
specially de-
to elimina-

variations in pressure. Other features include a counterbalanced door, gas-air ratio mixing valves, and capped connection for attaching pot type furnace, employing the single blower for both units.

The Barkling Multi-Purpose Toolroom Furnace is 25 inches wide x 19 inches deep x 53 inches high overall.

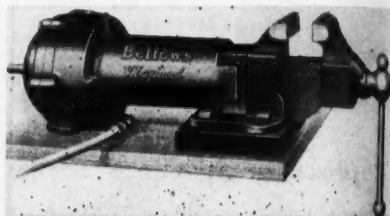
Airco Hi-Bond Flux

Specially made for use in the tinning of cast iron prior to brazing, a flux to be known as Airco Hi-Bond Flux has been developed by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. According to the manufacturer, the flux provides for the elimination of difficulties encountered in tinning cast iron due to its graphitic nature and makes possible highly satisfactory tinning of cast iron of high carbon and silicon content or low combined carbon analysis.

Airco Hi-Bond Flux may be applied as a water-mixed paste or as a powder that is sprinkled on the surface which has already been heated to the required temperature. It is supplied packed in 1-lb. glass containers.

Bellows "Vispeed" Vise

A vice which is arranged for either air or hand operation, to be known as the "Vispeed," has been developed by



Bellows "Vispeed" Vise

The Bellows Co., Akron, Ohio. The unit includes a standard 4-inch Reed bench vise operated by a powerful 8-inch, foot-controlled air cylinder. Clamping pressures are adjustable from 0 to 2½ tons.

The vise has a maximum jaw opening of 6 inches and features a positive safety control that limits the air-powered movement of the movable jaw, this movement being adjustable from 0 to a maximum of 1 inch. The Vispeed is foot

Season's Greetings



We extend our best wishes for the coming year, with the hope of an early victory. Whether for war production or peacetime purposes, Master Gauge stands ready to serve your requirements.

**GAUGES, DIES,
JIGS, FIXTURES**

**Prompt Delivery Now on
THREAD PLUG GAUGES**

MASTER GAUGE CO.

7206 FENKEL AVE.

Phone: University 3-7676

DETROIT 21, MICH

se
or either
known as
oped by

The unit
ed bench
ch, foot-
ing pres-
2½ tons.
y opening
positive
air-pow-
jaw, this
m 0 to a
ed is foot

S

e year,
er for
Master
ments.

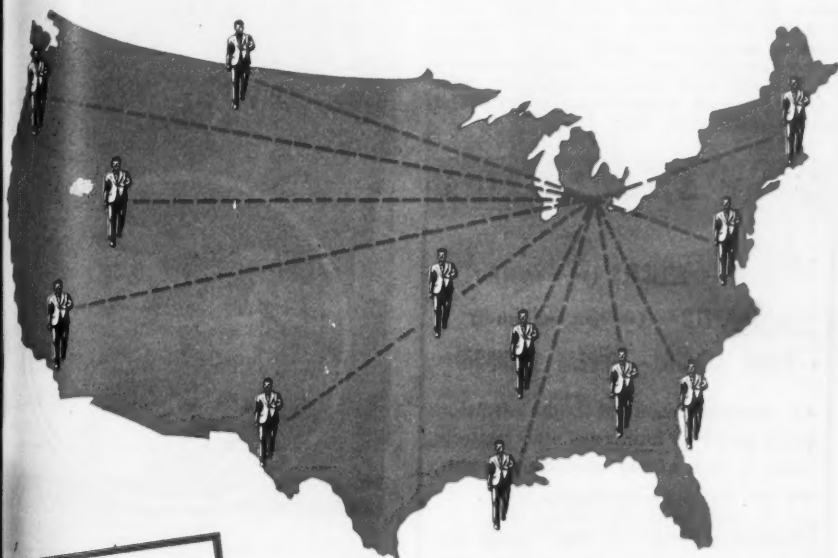
S,
ES

on
ES

, MICH

January, 1945

A NATIONAL Engineer is Nearby to Serve You!





**Call
Your
DISTRIBUTOR!**

Leading distributors in every section of the country have complete stocks of National Cutting Tools. Call your Mill Supply Distributor for National Cutting Tools or any staple industrial product.

NATIONAL SERVICE ENGINEERS are strategically located in every section of the country. These highly-trained specialists have had years of experience in dealing with all types of problems concerning cutting tools and their uses.

Their counsel and assistance are at your disposal. Just call the National distributor in your locality.



NATIONAL

TWIST DRILL AND TOOL COMPANY

DETROIT AND ROCHESTER, MICHIGAN

Twist Drill, Reamers, Boring Tools, Milling Cutters, Counterbores, Special Tools

January, 1945

controlled, thus allowing the operator free use of both hands for handling work. Slight toe pressure on the foot control provides for closing of the jaws, while heel pressure opens them. The jaws can be locked in either open or closed position. Normal hand operation of the vise is possible at all times.

The Vispeed is available as a complete unit consisting of a 4-inch standard Reed bench vise, 8-inch air cylinder pressure regulator, gage, quick exhaust valve, air-hose and foot pedal assembly, or the air unit may be obtained separately for easy attachment to any standard 4 or 4½-inch vise.

Gear Specialties

SPURS — HELICALS (14 to 96 D.P.)

BEVELS — (straight and spiral)

WORM GEARING — THREAD GRINDING

As manufacturers of high precision small gears for numerous vital controls used in this highly mechanized war, we are literally "swamped."

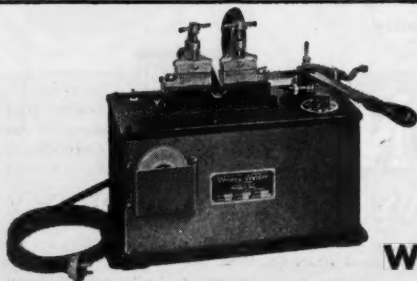
Therefore, under existing conditions, we are forced to minimize further commitments unless they have W.P.B. urgency support.

Gear Specialties

MANUFACTURERS

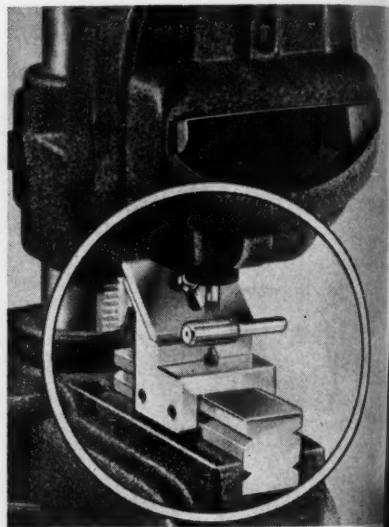


CHICAGO



Ball Point Accessory for Sheffield Visual Gages

A standard ball point accessory for use with Sheffield visual gages in the rapid and accurate production checking of pitch diameters of threaded parts is



Sheffield Visual Gage Equipped with Ball Point Accessory

announced by The Sheffield Corp., Dayton 7, Ohio. Adaptable to both 500-1 and 1000-1 models, the accessory includes a chromed bracket and adjustable backstop, with a threaded checking ball point of tungsten carbide mounted in the bracket. A second identical tungsten carbide ball point is provided in

BAND SAW WELDERS

No. 141 may be had without grinder or with grinder for removing flash. Has 6 point heat control, one for annealing weld.

Welds saws ¼" wide and smaller.

110 volt 60 cycle single phase. Can be made in 220 volt.

Send for catalog.

WELDEX INC.

7327 McDonald Ave.
DETROIT

effield

ory for
in the
necking
parts in



with Ball

Corp., Day
both 500-
cessary in
and adjust
ed checking
de mounte
ntical tung
provided

LDERS

der or with

point heat

er.

an be made

Donald A. Co.
TROT

January, 1945

BRADFORD METALMASTER LATHES

14½" - 16½" - 18½" Swing

TOOLROOM AND ENGINE TYPES

.. Also ..

CAM FEED
UNIT TYPE
DRILLING AND
TAPPING
MACHINES



1840 - 1944

The Bradford Machine Tool Co.

Trans at 8th St.

Cincinnati 4, Ohio

WHITNEY-JENSEN PRODUCTS
30 YEARS EXPERIENCE

POWER SQUARING SHEAR

Well-made, small size squaring shears now available in several sizes. Made in 36" and 48" width, 16 ga. capacity; in 42" width, 14 ga. capacity; and 60" width, 12 ga. capacity. Easy setting, fast action, accurate blade adjustment, and with adjustable front and back gauges.

No. 5 Jr. PUNCH



A handy tool for all sheet metal workers. Capacity ¼" hole in 16 ga. mild iron. Will punch in center of 4" disc. In metal kit with 7 punches and dies.

Write for new catalog.

WHITNEY METAL TOOL COMPANY

178 FORBES ST.

ROCKFORD, ILL.

MODERN MACHINE SHOP 303

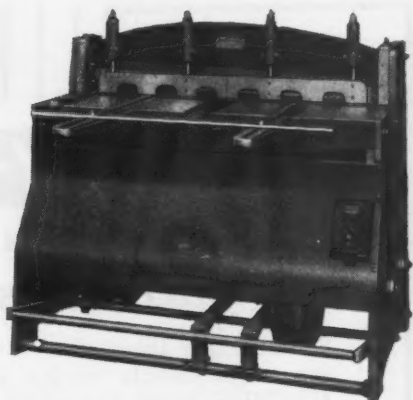
GRANT

RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to ½" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 3, Conn.



the visual gage spindle. The accessory has a capacity for 1-inch maximum work diameter and is set up with threaded masters instead of gage blocks.

Three pairs of ball points for 36, 20, and 12 threads per inch are furnished as standard with the accessory, and threaded parts from 11 to 56 threads per inch and up to 1 inch in nominal size can be checked. Pairs of ball points in other sizes are also available.

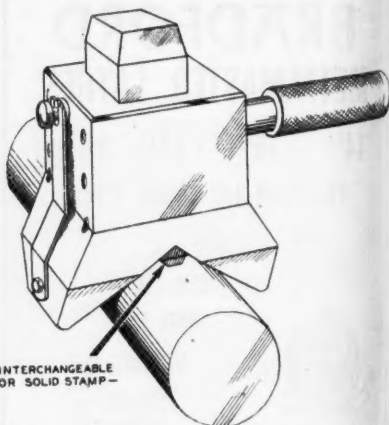
New Method Round Shaft Marker

A universal marking device for stamping numbers and letters on round shafts has been placed on the market by New Method Steel Stamps, Inc., 140 Jos. Campau St., Detroit 7, Michigan.

As shown in the accompanying illustration, the unit consists of a single V-block which serves to hold the actual stamping device—solid stamp or interchangeable type holder—and also automatically centers the stamping device on the outside diameter of the bar being marked so that all numbers will be stamped in line and with equal clarity.

A knurled stud, held firmly by a flat spring, fits into a slot which is ma-

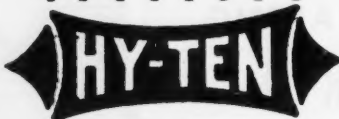
chined in the shank of the solid stamp or type holder. As a result of this de-



New Method Round Shaft Marker

sign, the stamp is held in alignment in the V-block yet is free to move vertically the necessary amount. A knurled

A. I. S. I.



S. A. E.

N. E.

ALLOY STEELS FOR VICTORY

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

WHEELOCK, LOVEJOY & CO., INC.

138 Sidney Street, Cambridge 39, Mass.

Cleveland 14, Chicago 23, Newark 5, Detroit 3, Buffalo 10, Cincinnati 33

d stamp
this de

Immediate Delivery FROM STOCK

GREAVES-SILENT BAKELITE GEARS

No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads . . . their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time . . . Money . . . Labor!

We also make silent gears of rawhide and Fabril.

Write for Circular.



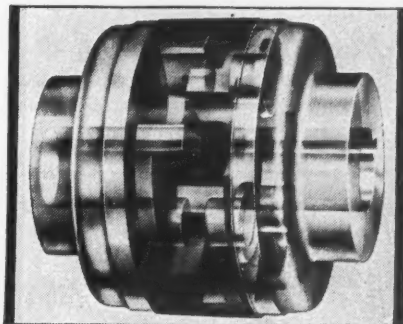
THE Greaves MACHINE TOOL CO.

2015-6 Eastern Ave.
Cincinnati, Ohio

INGENIOUS NEW PRINCIPLE "O-P" MULTIFLEX COUPLINGS

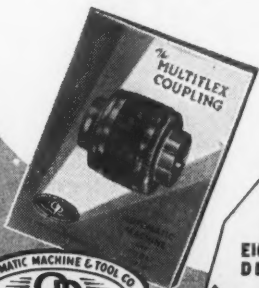
THREE UNIT SAFETY SMOOTH DESIGN

PATENT NO. 2271588



A MASTER-PIECE FOR PRODUCTION

Today — and in the tomorrow — the transmission of power is a vital factor. MULTIFLEX COUPLINGS were designed to transmit that power under all conditions. MULTIFLEX COUPLINGS give greater MULTIFLEXIBILITY against heavy shock and pulsating loads in any direction, also compensating for ANGULAR and PARALLEL MISALIGNMENT. So — for insured production order MULTIFLEX COUPLINGS.



WRITE
FOR THIS
EIGHT PAGE
DETAILED
FOLDER



AUTOMATIC

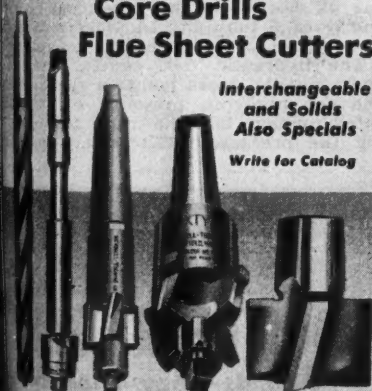
MACHINE & TOOL CO.

132 CHARLES ST. AUBURNDALE MASS. U.S.A.

Counterbores High Speed Back Spot Facers Core Drills Flue Sheet Cutters

Interchangeable
and Solids
Also Specials

Write for Catalog



BICKNELL - THOMAS COMPANY
GREENFIELD • MASSACHUSETTS

arker

alignment
move ver-
A knurled

neet
and

ls at

NC.

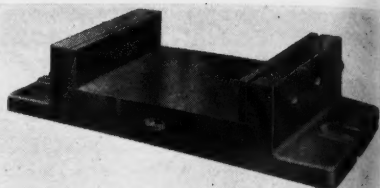
ati 32

handle permits the shaft marker to be held firmly in place on the bar stock while the actual stamping is being done.

The V-block of the New Method Round Shaft Marker is made in various sizes to suit a wide range of diameters in bar stock and cylindrical parts.

Challenge Holding Fixture

The Challenge Machinery Co., Grand Haven, Mich., announces the addition of a holding fixture to its line of pre-

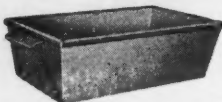


Challenge Holding Fixture

cision shop equipment. The fixture, according to the manufacturer, is designed to reduce the time required in setting up and loading milling machines, boring mills, planers, shapers, drill presses, and so on.

The Challenge Holding Fixture is available in three standard sizes and is sturdily constructed of special analysis semi-steel.

New Nesting Type Tote Pans



20" long x 12" wide x 6 1/2" deep.
16 ga., drag holes and handles both ends.

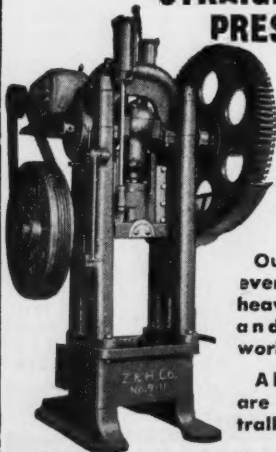
J. L. LUCAS & SON, INC.
Bridgeport, Conn.

Reimuller Hy-Speed Precision Punch Press

Combining the features of the V-way vise and the gap style press manufactured by Reimuller Brothers Co., 9400 Belmont Ave., Franklin Park, Ill., a precision punch press of semi-steel construction which can also be used as a pipe vise, tensile or compression testing machine, or a shear for plate or rounds is announced by this firm. Incorporating V-ways to eliminate the use of die shoes, the press has a capacity of 5 tons and includes a 5 x 6-inch platen with 7-inch ram movement.

The hydraulic foot control used in operating the press includes two levers, one for applying pressure up to the rated tonnage and the other for releasing the pressure. The latter provides

STRAIGHT SIDE PRESSES



Outstanding in every detail for heavy blanking and forming work.

All stresses are taken centrally.

Write for new catalog illustrating and describing this and other presses.

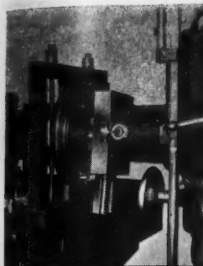
ZEH & HAHNEMANN CO.
184 VANDERPOOL ST., NEWARK 5, N. J.

GEARS GOOD GEARS ONLY

All Kinds—Any Quantity

AT THE RIGHT PRICE

THE CINCINNATI GEAR CO.
Weoster Pike Cincinnati, Ohio



For use on HORIZONTAL BARS

**WILL TAKE ANY CUT
THE BAR ITSELF
WILL STAND
A REAL TIME AND
.. COST SAVER!**

Regent

**SELECTIVE AUTOMATIC ...
FEED FACING AND BORING HEAD**

A moderately priced horizontal boring bar attachment that utilizes the forward and backward feed mechanism of the boring bar itself, providing a wide range of cuts for roughing and finishing. Up to 75% time saving on certain work is possible, as only one tool bit is used. Quickly detachable and ruggedly built—made in 2 sizes, model 10 with a range of from 0" to 12" diameter, and model 20, with a range of 0" to 24" diameter. Illustrated is model 20, on a step-facing job.

Complete information and prices on request.

**PAPER CONVERTING MACHINE CO.
GREEN BAY, WISCONSIN**

IMPROVED BALANCING WAYS



Four chilled iron discs rotate on special sensitive bearings. For balancing, straightening and truing. Write for details.

Swing	20"	40"	60"	72"	96"
Greatest Distance Between Standards	20"	30"	30"	66"	88"
Capacity in lbs.	1,000	2,000	2,000	5,000	10,000

ANDERSON BROS. MFG. CO.

1926 Kishwaukee St.

Rockford, Ill.

THE "FORM-MASTER"

ANGLE and RADIUS DRESSER

A sturdy, quality instrument designed by form-grinding specialists to dress both angles and radius at low cost. Two $\frac{1}{3}$ ct. diamonds and instrument case included—\$150.00 complete.

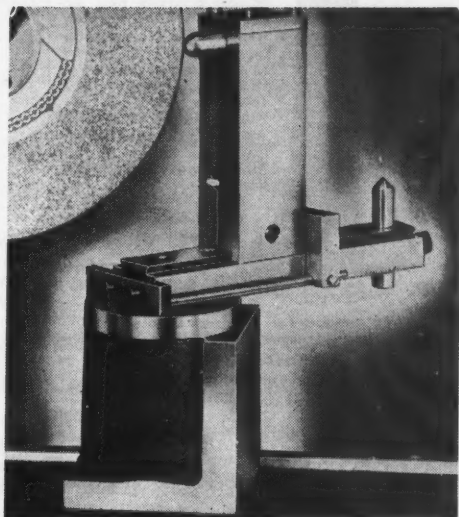
Features

- Large range
- Chatterless and dustproof
- .0001" accuracy obtainable
- Simple to operate
- Reasonably priced

Call your supplier or write

J. & S. TOOL CO.

477 Main St., E. Orange 5, N. J.



fixture,
is de-
sired in
g ma-
chines,
ure is
and is
analysis

sion

V way
anufac-
o., 9400
Ill., a
eel con-
used as
on test-
plate or
rm. In-
ate the
s a ca-
t 5 x 6-
vement.
used in
o levers,
to the
r releas-
provides

ONLY
tity

R CO.
ati, Ohio

January, 1945

January, 1945

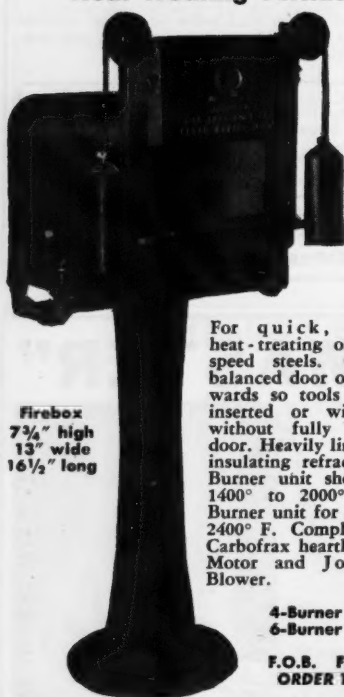
MODERN MACHINE SHOP 307

Johnson

Furnaces

for QUICK *Action*

No. 130-A Hi-Speed Steel Heat-Treating Furnace



Firebox
7 3/4" high
13" wide
16 1/2" long

For quick, accurate heat-treating of high speed steels. Counter-balanced door opens upwards so tools may be inserted or withdrawn without fully opening door. Heavily lined with insulating refractory. 4-Burner unit shown for 1400° to 2000° F. 6-Burner unit for 1800° to 2400° F. Complete with Carbofrax hearth, G. E. Motor and Johnson Blower.

4-Burner . \$295
6-Burner . \$325

**F.O.B. FACTORY
ORDER TODAY!**

FREE Use coupon for Johnson Catalog.

JOHNSON GAS APPLIANCE CO.
571 E. Ave. N.W., Cedar Rapids, Iowa
Please send me Free Johnson Catalog.

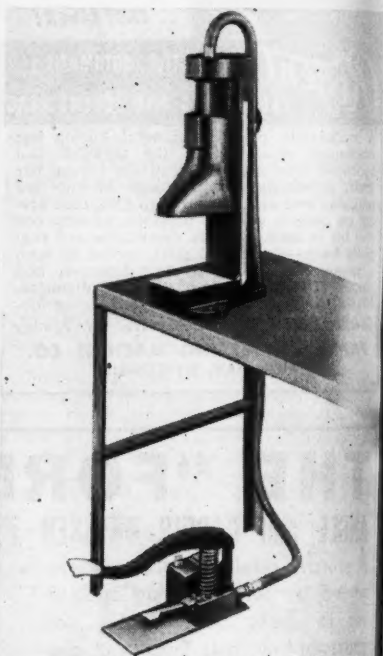
Name

Address

City..... State.....

for a two-speed return of the ram. No outside airlines or power is needed and the unit is said to be self-air eliminating.

Readily portable, the Reimuller Hy-Speed Precision Punch Press provided with the proper equipment can be used as a tensile and compression testing machine and as a pipe vise for handling up to 6-inch pipe or as a



Reimuller Hy-Speed Precision Punch Press

shear for 1/4-inch plate or 1/2 inch rounds. Further uses to which the unit can be adapted are marking, notching, riveting, crimping, and so on.

Griffin Welding Process for Thread Gages

A welding process for lengthening thread gage life is announced by the George O. Griffin Co., 1300 W. Hadley St., Whittier, Calif. The process is used both to construct new gages and to sal-

DERBYSHIRE

Fine Precision

WIRE CHUCKS



	Capacity
MAGNUS-ELECT004" to .315"
D. LARGE004" to .250"
D. W. W.004" to .196"

STANDARD ACCURACY
.0002" ECCENTRICITY

F. W. DERBYSHIRE, INC.
WALTHAM 54, MASSACHUSETTS



AIR-BLITZES dust, chips, filings from machinery, tools, parts. Cleans hard-to-get-at places. Snappy trigger action. Easy-grip handle. Leak proof valve. Strainer-screen at air inlet. Sturdy construction; practically no maintenance cost. Try one; you'll order more! Assortment of nozzles and extensions.

**Prompt
Delivery.**

PAASCHE AIRBRUSH CO.
1955 Diversey Parkway, Chicago 14, Ill.
Paasche Airbrush [Can.] Ltd., 110 Elm St., Toronto

SEND FOR NEW CATALOG KR



Just off the press—the most complete of its kind, illustrating the full line of GRO-BET ROTARY FILES, CUTTERS, DIESINKER'S BURS, etc., in size, shape and coarseness of cut for every industrial purpose.

(Please make requests for
Catalog KR on your firm
letterhead.)

GROBET FILE CO. of AMERICA

421 Canal Street



New York, N. Y.

IMPORTERS OF GROBET SWISS FILES

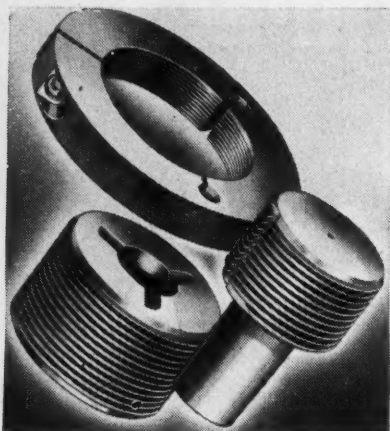
MFRS. OF GROBET ROTARY FILES

PLANTS: NEW YORK • CHICAGO • LOS ANGELES

MODERN MACHINE SHOP 309

January, 1945

vage old gages worn beyond tolerance limits. Worn gages are reclaimed by



Griffin Processed Thread Plug and Thread Ring Gages

removing the threads and welding on a solid deposit of chrome-carbide alloy,

then grinding new "on size" threads in this wear-resistant deposit. New gages are similarly constructed by welding the alloy on specially prepared blanks.

Griffin processed thread plug gages can be furnished in sizes of $\frac{3}{8}$ inch and larger; thread ring gages in sizes of $\frac{1}{2}$ inch and larger.

Simlok Safety Nut

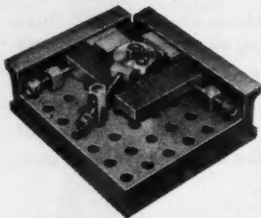
A dual-purpose safety nut featuring ease of installation has been announced by the Simlok Fastener Division of the Simmons Machine Tool Corp., Albany, N. Y. The nut operates on the principle of the engagement of a snap ring in one of a number of longitudinal serrations in the bolt thread. With seven serrations in the bolt thread, a total of 14 locking positions per revolution of the nut is provided. The nut can be used on any length thread and may be easily locked or unlocked by the mere flip of the locking ring.

The serrations in the bolt thread are cut by means of a simple internal broaching tool which is designed for use in close quarters and may be hand operated in the case of preassembled

PRECISION ACCURACY

with DAYTON ROGERS HOLOCATOR

(HOLE LOCATOR)



You can eliminate costly machine tool equipment with this angle plate "HOLOCATOR."

ABOUT 75% OF THE WORK THAT HAS TO BE PERFORMED ON A JIG BORING MACHINE CAN BE TAKEN CARE OF ON THIS PRECISION DEVICE.

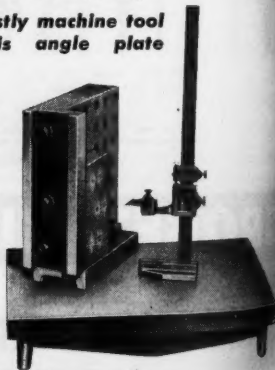
All precision drilling such as locating drilled or reamed holes, as well as laying out of dies and drill jigs, can be performed on an ordinary drill press.

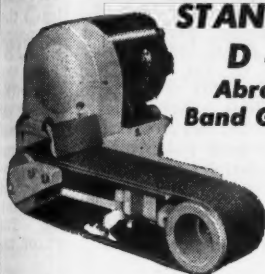
Write for illustrated bulletin No. 108-12.

DAYTON ROGERS MANUFACTURING CO.

2835 12th Ave. So.

Minneapolis 7, Minn.



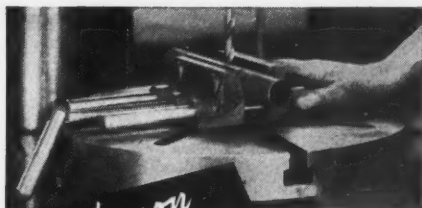


STANDARD D - 4 Abrasive Band Grinder

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.
96 Warren St., New York, N. Y.



Johnson
**SHUR-GRIP
DRILL VISE**

**\$15.50
EACH**

"SHUR-GRIP" Vise shown, on drilling job at Reynolds Machinery Co., Ship St. Rebuilding Plant, Providence, Rhode Island.

The "SHUR-GRIP" holds round, flat or rectangular parts — the latter in vertical or horizontal positions. Vise jaws contain grooves for holding rounds up to 2" in diameter, are of hardened steel, 5" wide and open 5".

The "SHUR-GRIP" cuts drilling set-up time 75% to 90%.

Send for illustrated bulletin and price list NOW!
Address Dept. 00.

JOHNSON TOOL COMPANY

LAWRENCE H. COOK, OWNER

PLASTIC MOLDS—TOOLS

65 MASSAHOIT AVENUE, EAST PROVIDENCE 14, R. I.

BUTTERFIELD TAPS

You can always rely on BUTTERFIELD TAPS to give the best possible results at the lowest expense. BUTTERFIELD TAPS can be supplied in four different grades as follows: 1. Carbon Steel Cut-Thread Taps. 2. High-Speed Steel Cut Thread Taps. 3. High-Speed Steel Commercial Ground Thread Taps. 4. High-Speed Steel Precision Ground Thread Taps.

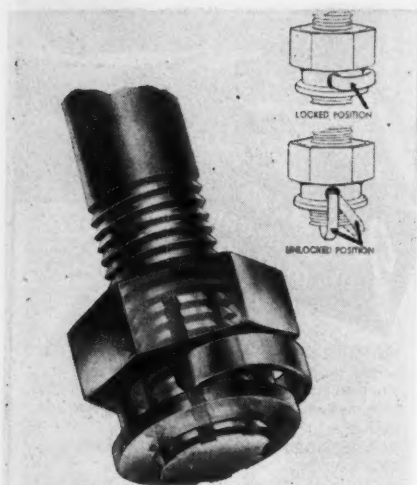
UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: DERBY LINE, VERMONT, U. S. A.
Athol, Mass.; Mansfield, Mass.;
Rock Island, Quebec, Can.

Stores:

Cleveland 3346 Superior Ave.
Chicago 11 S. Clinton St.
Detroit 5527 Woodward Ave.
New York 61 Reade St.





Simlok Safety Nut

parts. When the nut is used as a stopping device, the serrations in the bolt thread are not necessary. When

the nut is tightened and the locking ring snapped in locked position, the spring pressure provides a stopping action.

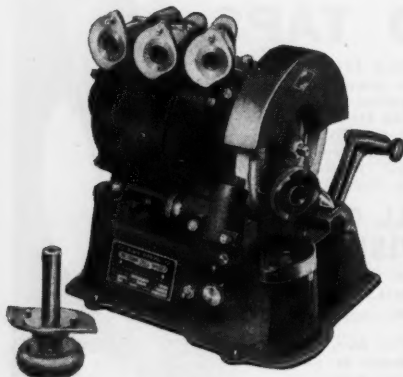
According to the manufacturer, the Simlok Safety Nut is designed to withstand abnormal heat, moisture, and oil conditions. It requires no additional torque or wrench pull and can be turned down by hand until the work is contacted. Standard open-end socket wrenches can be fitted over the nut, which requires no special bolts. The locking ring is a permanent part of the nut.

Bonded Lubricants

Bonded Oil System, Inc., 1356 Commonwealth Ave., Boston 34, Mass., is now marketing a line of lubricants which are scientifically blended by patented processes with the exclusive Bonded ingredient "Bonoleum." These lubricants, according to the manufacturer, possess unusual lubricating and penetrating powers by the elimination of surface tension and an inherent "active oiliness." Bonoleum is also claimed to have certain medicinal quali-

POST-WAR PRODUCTION OF CIVILIAN PRODUCTS WILL REQUIRE WAR PRODUCTION PRECISION. KEEP SMALL DRILLS SHARP WITH

BLACK DIAMOND PRECISION DRILL GRINDERS



Motor driven, these highly efficient Black Diamond Grinders will continue to serve efficiently in hundreds of large and small manufacturing plants throughout the nation.

Post-war production will require quantities of perfectly sharpened small gauge and fractional drills with lips of uniform length, correct angle and proper clearance for true, accurate drilling.

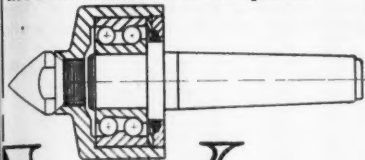
The Web thinner, an important attachment, cares for the proper grinding of Notched, Colton and so-called Crankshaft points . . . and the diamond dresser keeps the grinding wheel always sharp.

Order Your Black Diamond—Now

BLACK DIAMOND SAW & MACHINE WORKS, INC.
NATICK, MASS.

CENTER POINTS RUN TRUE and STAY TRUE

at All Speeds because a double-row preloaded precision bearing and ground-after-assembly point contribute to the accuracy and rigidity of Red-E Live Centers at all speeds.



Write for
Catalog S-44

THE READY TOOL CO.

510 Iranistan Ave.
Bridgeport, Conn.



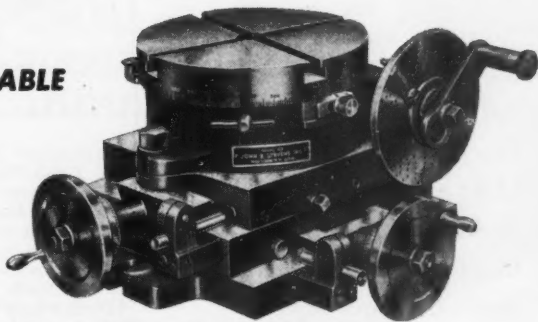
TYPE HOLDERS AND TYPE ROLL MARKERS
HAND STAMPS LOGOTYPES DIES STANDARD
AND SPECIAL STAMPS INSPECTORS' STAMPS
MACHINE ENGRAVING PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc.
149 Joseph Campau, Detroit 7, U.S.A.

No. 1 COMPOUND TABLE

shown with

7 1/2" ROTARY TABLE
MOUNTED



We Also Make
A No. 2 Size

Write for Bulletin

JOHN B. STEVENS INC.

482 CANAL STREET

NEW YORK 13, NEW YORK

ALWAYS
Dependable

Since 1880



Made by G. W. GRIFFIN CO., Franklin, N. H.

You can always depend on GRIFFIN HACK SAWS. No matter what the metal cutting job is there is a GRIFFIN BLADE that will satisfy. Insist on GRIFFIN from your distributor.

JOHN H. GRAHAM & CO., INC.

General Sales Agent

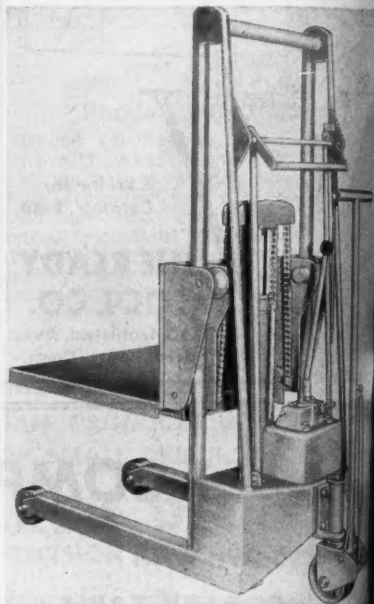
105 DUANE ST.

NEW YORK CITY

ties which are actually beneficial to the skin—an effective precaution against industrial dermatitis.

Lyon-Raymond Hydraulic High-Lift Truck

A combination lift and tiering truck the Lyon-Raymond Hydraulic High-Lift Truck shown in the accompanying



Lyon-Raymond Hydraulic High-Lift Truck

illustration is now being introduced by the Lyon-Raymond Corp., 1620 Madison St., Greene, N. Y. Light in weight (495 lb.), the truck can be quickly and easily maneuvered and readily turned within its own length.

The Lyon-Raymond Hydraulic High-Lift Truck is constructed of special tubular and formed steel and is Timken bearing equipped. Additional features of the unit include a powerful floor jack and fingertip-controlled lowering device. The truck as shown has a capacity of 1,000 lb. and is provided with a platform 24 inches wide x 30 inches long which can be raised from 6 to 12 inches from the floor. Special requirement trucks can also be supplied.

Special to
against

High-

ing truck,
c High-
npanying



Lift Truck

roduced by
20 Madison
in weight
quickly and
dily turn

aulic High-
of speed
d is Timko
al feature
ul floor lo
owering de
has a ca
rovided with
x 30 inch
rom 6 to
cial require
plied.

January, 1945

ALLIGATOR



TRADE MARK

FILES

Over 4,000 shapes,
cuts and sizes of both
Swiss and American
patterns.

Get all your files
from one source.

Write for new catalog.

Garson - Newton Co.
61-71 MILL ST.
MILLEVILLE, NEW JERSEY



HAMILTON SWISS TYPE GEAR HOBBERS

...for accuracy
and speed in
hobbing
PINIONS,
GEARS and
SECTORS.

TWO MODELS

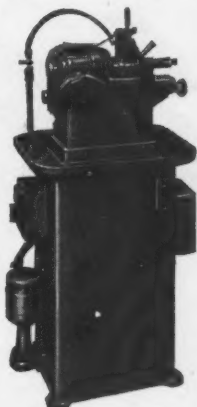
No. 00 SPUR GEAR
HOBBER (illustrated)
for work up to 2"
diameter.

No. 1 SPUR and
SPIRAL GEAR HOBB-
BER for work up to
6" diameter.

Write for further
details to:

TRIPLEX MACHINE
TOOL CORP.

Sales Agents
125 Barclay St.,
New York 7, N. Y.



Manufactured by
The HAMILTON TOOL Co.
Hamilton, Ohio

BUILDERS' T' SURFACE GRINDER



**SMALL
RUGGED
USEFUL**

Builders hand operated 'T' Grinder is the "Jeep of the
toolroom." Small in size, it does the work of large,
expensive machines. Rugged construction assures years
of odd job precision grinding or production surfacing.

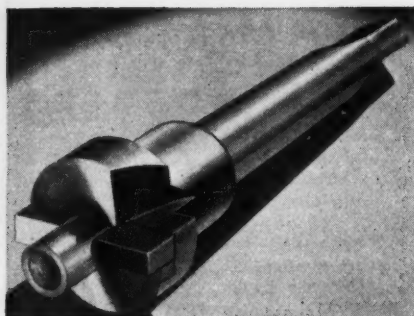
**BUILDERS
IRON
FOUNDRY**

19 Coddling St.
Providence 1,
R. I.

Prompt delivery.
Send for Bulletin 644.



MODERN MACHINE SHOP 315



Rieger Multifacer

Rieger Multifacer

Applicable to drill press, engine and turret lathes, and milling machines for spot facing, boring, counterboring, valve seating, and cutting convex or concave annular rings, a tool to be known as the Multifacer is now being introduced by The Rieger Manufacturing Co., Dept. MMS-10, Miamisburg, Ohio.

The head of the tool is slotted for the

insertion of a bit ground to the desired contour which is locked in place by means of three set screws. Due to three-point suspension, the bit can be adjusted to cut evenly although the grinding may be somewhat faulty. Clearance slots provide for the escape of shavings and chips.

The Rieger Multifacer is available in three standard sizes for cutting diameters from 1 to 5 inches. Other sizes can be obtained on special order. The tool is constructed of tough alloy steel and is heat treated and ground to withstand severe usage.

De-Sta-Co Model No. 605 Toggle Clamp

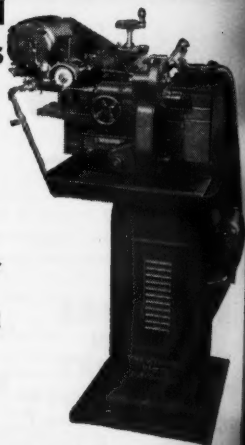
A "push-and-pull" action clamp which is said to be especially well suited for use in connection with locating and indexing operations, to be known as the De-Sta-Co Model No. 605 Toggle Clamp, has been placed on the market by the Detroit Stamping Co., 349 Midland Ave., Detroit 3, Mich. The work end or plunger rod of the clamp is tapped to accommodate a $\frac{3}{8}$ -inch, 18-thread stand-

AUTOMATIC UNIVERSAL FLUTE GRINDER No. 50F

For grinding straight and spiral flutes from solid in tools such as

- Taper pin reamers
- Reamers as small as 1/16th inch in diameter
- Small Taps
- Teeth in side milling cutters
- Angular Cutters
- Sharpen saws as small as $\frac{1}{2}$ " and up to 8" in Diameter and in gangs up to 3 $\frac{3}{4}$ " long
- Can also be arranged for other special work on special order
- Produces precision tools with unskilled labor.

Write for Bulletin 50F.



THE **WARDWELL**

MANUFACTURING CO.
3166 Fulton Rd., CLEVELAND 9, OHIO

desired
place by
to three-
adjust-
grinding
clearance
shavings

available in
g diam-
sizes can
The tool
steel and
withstand

605

mp which
suited for
ting and
own as the
le Clamp,
et by the
and Ave.
k end of
tapped to
lead stand-

D. 50F

9, OHIO

January, 1945



DANLY

DIE SPRINGS

MEDIUM PRESSURE
HIGH DEFLECTION
HIGH PRESSURE
MEDIUM DEFLECTION

DANLY MACHINE SPECIALTIES, INC.
2100 South 52nd Avenue • Chicago 50, Illinois

Milwaukee... 111 E. Wisconsin
Detroit... 1549 Temple Ave.
Cleveland... 1550 E. 33rd St.
Dayton... 16 Commercial St.
Rochester... 3858 Pulaski Av.
Philadelphia 47-28 37th St.
Long Island City 47-28 37th St.
Ducommun Metals & Supply
4890 S. Alameda, Los Angeles

HURON

ALL STEEL GAGE HANDLES

TAPER-LOCK and TRI-LOCK



ALL 10 STANDARD SIZES

The
Best Costs You
Less!

WRITE FOR LITERATURE, PRICES, DISCOUNTS

HURON MACHINE PRODUCTS
5353 CONNER AVE. • DETROIT, MICH.



New

KIPP

Featherweight

AIR GRINDER

New

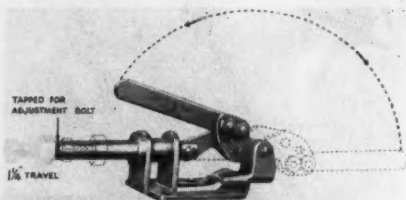
\$29⁷⁵ in U.S.A.
Weight 12 Ounces; Length 6 3/4 In.;
Chuck Size 1/2 In. Wheel Guard
Removed for Better Illustration

The Model JA is new in design both inside and outside. In it are utilized fewer parts, and they are made of Magnesium and Aluminum for extreme featherweight lightness. The alloy steel shaft diameter is unusually large for sustained smooth and true operation. This means still longer wheel life and better grinding. The speed, as before, is governed at 50,000 R.P.M. and there are selected ball bearings, front and rear. The JA Featherweight is a distinct improvement over all models previously produced by Madison-Kipp, the originators of really high speed grinders.

The same low price, \$29.75 in U.S.A., remains. It is a post-war design for which materials have been released early. The pre-announcement output was geared to expected demand. Deliveries will be made out of stock as long as possible.

MADISON-KIPP CORPORATION
208 WAUBESA ST., MADISON 4, WIS., U.S.A.

ard bolt which provides for quick adjustment of the clamp to suit the job at hand. The plunger rod has the maximum travel of $1\frac{1}{4}$ inches.



De-Sta-Co Model No. 605 Toggle Clamp

By simply relocating one of the handle bolts, the De-Sta-Co Model No. 605 Toggle Clamp may be converted from "push" to "pull" action or vice versa. The clamp weighs 9 oz., and, when in "push" locked position, measures $5\frac{1}{2}$ inches long x $2\frac{1}{4}$ inches wide x $2\frac{25}{32}$ inches high. When used as a "pull" clamp, the unit, in locked position, is $7\frac{1}{8}$ inches long x $2\frac{1}{4}$ inches wide x $2\frac{1}{2}$ inches high. The clamp is provided with a bright, rust-resisting plated finish.

"Merix" Anti-Fog Compound

An anti-fog liquid compound that is designed to prevent the formation of mist, fog, or steam on any type of glass or plastic surface, to be known as "Merix," is now being manufactured by the Merix Photo Co., Dept. 58, Wrigley Bldg., Chicago 11, Ill. Easily applied, the compound is said to be non-inflammable, non-toxic, non-acid, and to be unaffected when exposed to light.

According to the manufacturer, a small amount of Merix applied to any glass surface with a soft cloth or cotton batting forms an invisible protective film which keeps the surface free of mist, fog, or steam for indefinite periods. The compound is claimed to be ideal for goggles, windshields, camera lenses, optical airplane instruments, and any other glass or plastic surface where temperature variations between the inside and outside, moisture, fog or steam causes these areas or instruments to become foggy. In addition, Merix, it is stated, can be used to clean glass and plastic surfaces without harming so as to remove any form of dust, dirt, or fingerprints, and to assure clearest possible vision.



BONE TOOLS and GAUGES "Choppers"

are
Tough
on the
Jap's

Mr. Jap knows now that he has bit off more than he can chew . . . And Adolf realized his mistake long ago. Let's all work harder to finish 'em off in a hurry. Bone Tool and Gauge are doing their part.

GAUGES . .

Taper, Build-Up
Indicator, Snap.

DRILL JIGS . . . FIXTURES . . .

PLASTIC DIES . . .

WHITE METAL DIES

Any type of Tool,
Die or Gauge
Work to your
specifications.

Phone Johnny House, Vermont 7-7270, Detroit
BONE TOOL & GAUGE CO. •

17500 Grand River Ave.
DETROIT 27, MICHIGAN

HARGRAVE
Clamps



To help speed plane output, HARGRAVE Clamps are used extensively by leading aircraft manufacturers. And because of their unusually wide range of sizes and patterns, the nation's industries find these **Individually Tested** Clamps best meet their clamping needs.

Write for catalog showing the complete line of HARGRAVE Clamps, Chisels, Punches, Washer Cutters, File Cleaners, etc.



See Your Supplier

THE CINCINNATI TOOL CO.

Founded in 1879

1947 Waverly Ave., Cincinnati 12, Ohio

PROMPT DELIVERY
PRECISION GROUND
THREAD PLUG & RING GAUGES

American Nat'l Coarse Threads
American Nat'l Fine Threads
American Nat'l Special Threads
In Accordance to A.G.D.

Single End—Double End Plugs
—Combination of a thread plug and plain core plug for minor diameters.

Split Adjustable or Solid Ring Gauges.

(Catalogues Not Available)

Sizes of plugs up to 10" dia.

Sizes of rings from 1/8" to 8" I.D.



Attractive offer for Representatives and Supply Houses

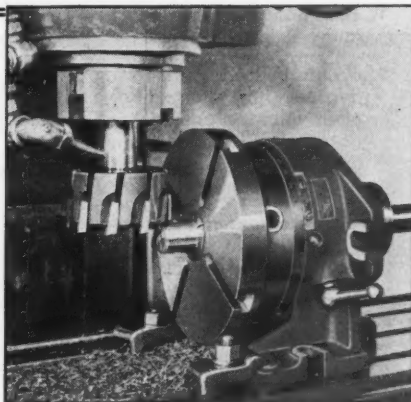
ALLEN GAUGE & TOOL COMPANY

Dept. C, 421 N. Braddock Ave. (21), Pittsburgh, Pa.

THE HARTFORD
"SUPERSPACER"

for Milling, Grinding, Jig Boring and Slotting

The Hartford Super-Spacer, mounted with a draw-in collet and face plate combination is adaptable for Milling, Grinding, Jig Boring and Slotting—at speeds and feeds limited only by the capacity of the holding means and the power of the machine. The illustration at right shows its adaptability for milling bar stock.



THE HARTFORD
SPECIAL MACHINERY CO.

HARTFORD

5

CONNECTICUT

Write for further particulars.

River Ave.
MICHIGAN

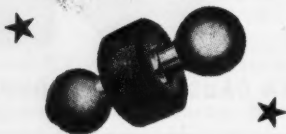
January, 1945

MODERN MACHINE SHOP 319

3 **IMPORTANT** **Advantages**

**of METCALF
DRESSERS**

**for Small or Thin
Grinding Wheels**



1. Ball handles give exact weight and balance needed.
2. When held at angles of 30 to 40 degrees from horizontal, cutting effect of one abrasive wheel upon another removes bond from cutting particles—leaves them standing out sharp and clean.
3. Gyroscopic action, caused by rapid rotation of wheel on its axis, provides steady, accurate dressing with minimum expenditure of material and effort. And the low wheel-replacement cost means added savings for you!

Price, Complete . . . \$5.00
Extra Wheels, only .75

**Send for a copy of
Bulletin 444-1 today!**

COVEL-HANCHETT CO.
BIG RAPIDS, MICHIGAN

Plan-O-Mill Carbide Insert Thread Milling Cutter

A line of carbide insert thread milling cutters which are said to provide fast cutting action with a resultant fine work finish is announced by the Plan-O-Mill Corp., 1511 E. Eight Mile Rd., Hazel Park, Michigan.

Designed to afford long life, the cutters are available in National, Whit-



**Plan-O-Mill Carbide Insert Thread Milling
Cutters**

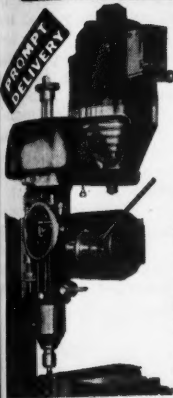
worth, Acme, V, and special forms ground or unground, with straight or spiral flutes, with or without provision for the Higbee cut. As shown in the accompanying illustration, both shank and shell type cutters are offered.

Standard Improved TeBo Gage

Standard Gage Co., Inc., Poughkeepsie, N. Y., announces the production of an improved fixed limit type TeBo gage for bore-gaging operations. The gaging head is a section of a sphere with a protective plating of hard chromium. Due to this plating and because the points of gaging contact are as numerous as the number of theoretically widthless lines which might be inscribed on the surface of a sphere the gage is said to retain its accuracy.

MILLING - DRILLING - BORING ATTACHMENT for Heavy Duty Operations

PROMPT
DELIVERY



EASY MOUNTING LARGE QUILL— 4" TRAVEL

(counter balanced,
hardened, and ground)

6 SPEEDS,
250-3000 RPM.

Lever and Worm Feeds
 $\frac{1}{2}$ H.P. Motor

Specially engineered by
RUSNOK to meet the de-
mand for heavier duty end
mill operations. Use
many types of cutters on a
wide range of work. Large
size spindle (No. 9 B & S
taper). Takes $\frac{1}{8}$ " to $\frac{3}{4}$ "
end mills. Precision Engi-
neered and Ruggedly Con-
structed Throughout.

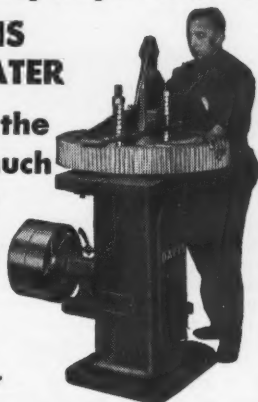
Write for descriptive folder.

RUSNOK TOOL WORKS
4840 North Avenue, Chicago, Ill.

Why Use A Shaper to cut Keyways when a

DAVIS KEYSEATER

will do the
job so much
quicker
and
better?



Send
for
Circular

DAVIS KEYSEATER CO.

Exchange and Glasgow Sts.
ROCHESTER, N. Y.

C-F POSITIONERS

When "Position" Counts Most

On automatic welding jobs, like the one illus-
trated here, position counts "most," and with
the C-F Positioner (with 6 sizes, and capacities
to 30,000 lbs.) the tables tilt to 135° beyond
horizontal and rotate 360°, all under push but-
ton control. The exclusive C-F Variable-Speed
Control gives table rotations ranging from 0
R.P.M. up for all sizes. For "quick change" of
position, for greater time saving and efficiency,
for lower costs and greater safety to men and
materials, specify C-F Positioners for all auto-
matic and production welding operations.

Write for Bulletin WP-22

CULLEN - FRIESTEDT CO.

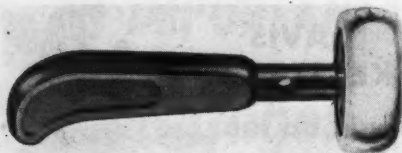
1311 S. Kilbourn Ave. Chicago 23, Ill.



MODERN MACHINE SHOP 321

over an unusually long period.

According to the manufacturer, the spherical head contributes to frictionless operation and effortless insertion



Standard Improved TeBo Gage

and withdrawal of the gaging head when checking bores. In addition, the design is said to eliminate the possibility of the gage becoming jammed within the bore and provides for a simple operating technique.

On the periphery of the spherical head is a small projection which is also a part of a true sphere. This projection may be adjusted to the limit of maximum tolerance or to compensate for wear. Adjustment within reasonable limits is easily made by two tapered screws acting against the insert in a

"V." By adjusting these screws, the "no go" factor can be increased or decreased within the dimensional limits of the gage and held constant to various tolerances.

When a bore being gaged is between minimum and maximum tolerances, the TeBo gage head enters freely and may be located on its horizontal axis until stopped by contact of the projection with the bore wall. If the bore exceeds maximum tolerance, the gage handle, when released, drops below the bore axis. It will also drop when the gage encounters, at any station, such irregularities as out-of-roundness, taper, bell, ovalness, or even faulty finish.

The handle is precisely balanced to the weight of the head. Its position, as well as the "feel" of the gage, indicates the internal condition of the bore to even relatively inexperienced operators it is claimed.

Knu-Visé Vise-Wrench

An improved vise-wrench is announced by Knu-Visé, Inc., 2201 Eighth St., Detroit 16, Mich. Of versatile design

Save THE COST OF MAKING SPECIAL MILLING AND DRILLING FIXTURES



For clamping parts of uniform thickness.



For clamping parts of varying thickness.

Use Presto-Vises Instead!

Why go to the expense of making special milling and drilling fixtures! We can furnish a Presto-Vise with special jaws to suit your work at a fraction of the cost. When the job is finished, the vise can be used on other work by merely changing jaws. No scrapping of costly fixtures after every job!

Savings run as high as 75%, as compared with the cost of special fixtures. And the saving in loading and unloading time is equally amazing. Write for complete information.

D. A. SMITH & CO.

55 Selden,

Detroit 1, Mich.

Free CATALOG

PRESTO-VISE

EXTRA WIDE RANGE DORMAN TAPPERS

No. 1 tapper friction or positive drives 2-56 to $\frac{3}{8}$ " taps in steel or any other material.

No. 2 positive tapper drives $\frac{1}{4}$ " to $\frac{3}{4}$ " tap in steel or any other material, and No. 3 drives $\frac{1}{2}$ " to 1" in steel or any other material.

DELIVERY FROM
STOCK
SOME SIZES.

Write for details.

DORMAN MACHINE TOOL WORKS

357 CANAL ST. • NEW YORK 13, N. Y.

PRECISION GEARS

AS SMALL AS
5/16"

ARE BEING
PRODUCED BY
**DETROIT
BEVEL GEAR**



Gears of all types
are manufactured ex-
actly to your specifica-
tions in sizes up to 16".

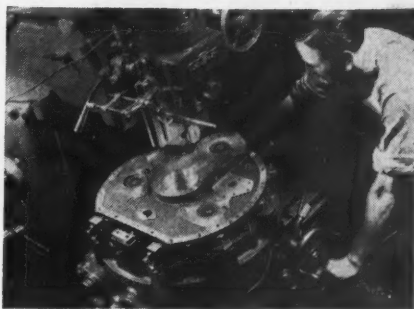
Supplied in any desired Material

DETROIT BEVEL GEAR COMPANY

8138 JOSEPH CAMPAU AVE.
DETROIT 11, MICH.

Makers of Quality Gears for 30 Years

HOURS OF DOWN TIME? or a break for a cigarette!



Simple
Intelligent
Rapid
Revolutionary
Low Cost

Recovery and Segregation of lubricant, coolant, sludge, metal chips—according to alloy, including water, semi-mud and other liquids. Machines that formerly required hours to clean can now be cleaned in minutes—or in the time the operator takes a break for a cigarette.

One manufacturer reports "This vacuum equipment is very essential in removing sludge, oil, grime, soda-water, dirt, etc., from 2700 machines. This method is very efficient, and greatly increases the life of the machines as well as conserves considerable man-power now urgently needed on production operations."

Write for details stating your problem

Doyle VAC-IT

DOYLE VACUUM CLEANER CO.

3225 Stevens St., S.W. Grand Rapids 7, Mich.

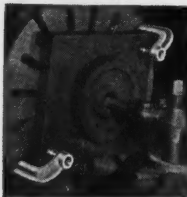
the tool can be used as a portable vise to hold work for drilling, welding, riveting, grinding, and so on, or as a pipe wrench. The milled teeth of the tool are made of alloy steel forgings which have been properly heat treated to provide maximum wear resistance and which are welded to the stamped body, which is also heat treated.

An advantage of the Knu-Vise Vise-Wrench is the fact that a locked grip can be maintained on work without the aid of hands. When completed, the work can be instantly released as in

the use of ordinary pliers. With normal hand grip, a clamping pressure up to one ton can be obtained at the jaws of the tool.



Knu-Vise Vise-Wrench



Cut Set-Up Time

75% through use of the
New Advance Clamps
(the only T-slot clamps)

Clamp directly over work. For use on all machines with T-slots. Standard and Heavy-Duty type.

Write for circulars.

ADVANCE MACHINE WORKS

3727 Weisser Park

Fort Wayne, Indiana

QUICK DELIVERY
Write for Specification
Sheets and Prices . . .
COLONIAL BUSHINGS, Inc.
145 Jos. Campau St., Detroit

COLONIAL
DRILL JIG BUSHINGS

The Knu-Vise Vise-Wrench is available in two sizes: a Model VG-10 which is 10 inches long and weighs 18 ounces and a Model VG-7 which is 7 inches long and weighs 13 ounces.

Gray Pendant Station Control for Planers

The G. A. Gray Co., 3611 Woodburn Ave., Cincinnati 7, Ohio, is now introducing a pendant station control for planer tables which is said to effect an increase in production and a saving in tools when used on certain types of work, such as castings with hard spots, castings with sand inclusions, steel forgings with scale inclusions, and so on. The control, according to the manufacturer, can be installed on any new variable voltage planer equipment.

In operation, the planer hand identifies the hard spots and inclusions of the casting with chalk marks and starts his machine operating with the normal cutting speed which would regularly be used on work having no hard spots. A special button marked "Slow-Down" is provided in the pendant station and is pressed by the operator as a hard spot approaches the cutting tool, thus

GRAY TURRET HEAD METAL CUTTER OR NIBBLER



GRAY, Originator of First Practical Metal Cutter or Nibbler

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO.
Box 596, Philadelphia, Pa.

normal
up to
e jaws

is avail-
to which
ounces.
ches long

control

Woodburn
ow intro-
control for
to effect
a saving
types of
ard spots,
ons, steel
s, and so
the manu-
any new
ement.
and identi-
clusions of
and starts
the normal
regularly be-
ard spots.
low-Down"
station and
as a hard
tool, thus

HEAD
NIBBLER

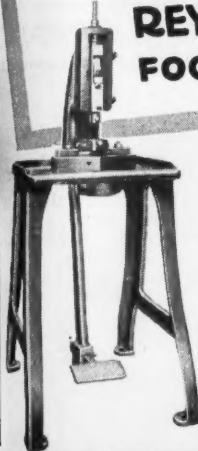
Igniter of
cal Metal
Nibbler

Nibbler for
cutting, Tool
building, Air-
Aircraft Tub-
Plate Shops.

CHINE CO.
Philadelphia, Pa.

January, 1945

REYNOLDS FOOT PRESS



\$65 Complete
as shown

F. O. B. Providence
(Crating \$5.00 Extra)

SPECIFICATIONS

Full Length stroke 23 3/8"
Greatest distance from
bottom of plunger
to platen 5 3/4"
Length of Collet 1 1/2"
Distance between cen-
ter of plunger and
back of press 3 3/8"
Distance between cen-
ters of stud bolts 7 1/8"
Floor space 22" x 22"
Weight about 300 lbs.

REYNOLDS MACHINERY COMPANY

211 EDDY STREET, PROVIDENCE 3 RHODE ISLAND

LUMA Patented

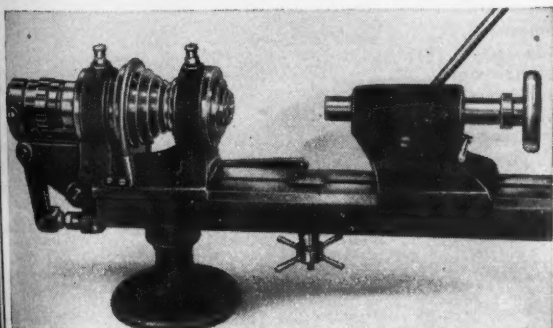


Combination Demagnetizer and Electric
Etching Pencil. Marks symbols in hard-
est steel. Demagnetizes instantly.

One of our models popular in tool rooms
for 15 years.

Luma Electric Equipment Co.
DEPT. MS TOLEDO 1, OHIO

DERBYSHIRE *Fine Precision* LATHES



FOR INSTRUMENT AND WATCHMAKING

- THREAD CUTTING
- CENTERING
- TURNING
- GRINDING
- DRILLING
- REAMING
- FORMING
- MILLING

• Illustrated • CAPACITY .315" • BED 12" • SWING 3.94"
MAGNUS BALL-BEARING LATHE • COMBINATION TAILSTOCK
SPRING-BIND COLLET CLOSER ATTACHMENT.

F. W. DERBYSHIRE, INC., WALTHAM 54, MASSACHUSETTS

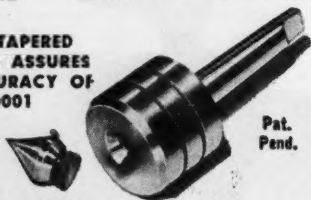
January, 1945

Empire LIVE CENTER

With Interchangeable Points

ACCURATE • VERSATILE • HEAVY DUTY

THE TAPERED
SEAT ASSURES
ACCURACY OF
 $\pm .0001$



Pat.
Pend.



Empire Toolmaker's
Set available in
wooden case—
each tool in
its own re-
cess.

Points for Various Operations

- A. Very large, for pipe or tubing work
- B. Extra long point used in facing operations
- C. Extra wide point for large diameter work
- D. Standard point
- E. Blank made of soft tool steel for nests
- F. Female for work not having centers

Send for Literature



69 SPRING STREET • NEW YORK 12, N. Y.

Mid. in all tapers,
straight shanks,
and specials.

causing the table to slow down to a very slow speed as the tool enters the hard spot. When the tool leaves the hard spot, the operator releases the button and the table resumes the normal speed predetermined by a rheostat setting.

"Dustex" Portable Dust Collector

Designed to remove from the air dangerous and obnoxious dusts arising from industrial operations, a portable



"Dustex" Portable Dust Collector

dust collector to be known as the "Dustex" is now being offered by the Dust Filter Co., 4418 N. Clark St., Chicago 40, Illinois.

Manufactured in four sizes from 30 to 51 inches high and weighing 75 to 200 lb., the unit affords a compound action on the air borne dust. The dust is first separated from the air stream by centrifugal action and then impinged on the filter surface. The unit is said

STANDARD



SINCE 1915

HEADS

FIVE
TYPES

FIFTY-SIX
SIZES



Two Spindle Head
Both Spindles
Adjustable

United States Drill Head Co.
Cincinnati 4, Ohio



PRECISION

DIE MAKING MACHINES

Two companion machines that far outrange in versatility and ease of operation any combination unit. The Grob Band Saw and the Grob Filer embody exclusive principles of design and construction not found in any other single machine. Write us for details which prove their place in your plant.

GROB BROTHERS
GRAFTON, WISCONSIN

TIME SAVER FOR QUICK CHANGE MARKING

- Fastest and simplest way to number parts.
- Easy! Just turn screw to change numbers.
- Made of best quality tool steel.
- Guaranteed for years of service.
- PROMPT DELIVERIES



STOCK TYPE

- # 1... BA 1864249
- # 2... BA 186429
- # 3... BA 1864

SOSSNER

161 Grand St. New York 13, N. Y.

WITH
HANDY
TYPE BOX



to maintain a constant static air suction of more than 4 inches at a velocity of over 5,000 l. f. m.

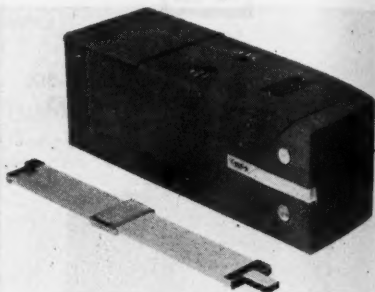
Completely fireproof, the Dustex Portable Dust Collector, according to the manufacturer, successfully separates the most minute dust particles. The filter assembly consists of two corrugated layers of wire mesh covered with 60-mesh filter cloth. The filtered air is discharged back into the room through a muffler which deadens air noise.

G-E Type PM-17-A1 Miniature Six-Element Oscillograph

A self-contained, unusually compact, permanent-magnet oscillograph, designated as the Type PM-17-A1, has been announced by the General Electric Co., Schenectady 5, N. Y. This six-element unit consists of three principal systems—optical system, six parallel galvanometer channels, and photosensitive-material transporting mechanism with internal motor and removal film holder—all of which are enclosed in a light-tight metal case $4\frac{1}{2}$ x $4\frac{1}{2}$ x 14 inches.

The weight of the complete instrument is approximately 10 pounds.

The G-E Type PM-17-A1 Miniature Six-Element Oscillograph is designed to



G-E Type PM-17-A1 Miniature Six-Element Oscillograph

directly record small values of potential or current, such as the output of amplifying equipment. A wide range of potentials or currents can be recorded by the use of appropriate external resistors, instrument transformers or shunts.

**$\frac{1}{8}$ H. P.
35,000 R. P. M.
UNDER LOAD**

**WEIGHS
35 OZ.**



MORE POWER LESS WEIGHT

Twice the power and twice the speed of any other electric handtool! Use for faster, smoother grinding, milling, deburring, and finishing of steel, non-ferrous metals, plastics, and most other materials. Speeds up to 35,000 r.p.m. under load reduce frictional wear on mounted wheels by as much as 200%.

Fully cased in durable, lightweight plastic and fully guaranteed shock-proof without wire on AC or DC. For close jobs attach COOLFLEX Flexible Shaft to extend full power and speed to 9-oz. cool-running hand piece.

Send for Helpful 20-page Booklet

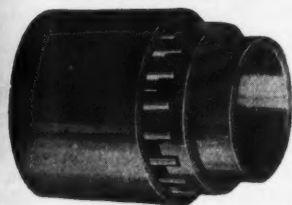
PRECISE PRODUCTS COMPANY
1345 CLARK ST., RACINE, WIS.

**GRINDS
MILLS
DEBURRS
ENGRAVES
POLISHES
FINISHES**



THE PRECISE 35

GWILLIAM JOURNAL ROLLER BEARINGS



Type JRC

STANDARD SIZES SHOWN IN OUR
GENERAL CATALOG

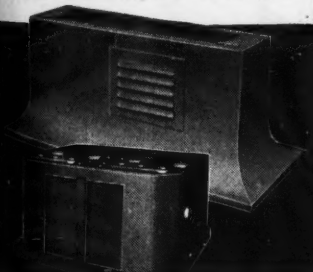
Copy Sent Upon Request

THE GWILLIAM CO.

358 FURMAN ST.
BROOKLYN, N. Y.

MACHINE BASES

Why use expensive cast bases when Littleford can fabricate them from plate and sheet steel to fit all types of machines. Send blueprints for estimates.

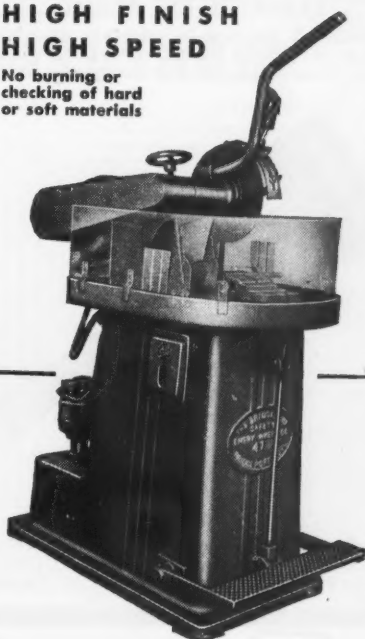


LITTLEFORD

LITTLEFORD BROS., INC.
433 E. Pearl St.,
Cincinnati 2, Ohio

HIGH FINISH HIGH SPEED

No burning or
checking of hard
or soft materials



Bridgeport WET CUT-OFF MACHINE

Cuts quickly and cleanly all ordinary and alloy steels, brass, bronze, copper, plastics, porcelain, etc.—in solid bar, tubing or irregular shapes. Usually eliminates the finishing operation, saving wheel and cutting costs. Two models: No. 47W (shown above), for solids up to 1" and light tubing up to 2"; No. 48W, for solids up to 2½" and light tubing up to 3½". Details on request.

The Bridgeport Safety Emery Wheel Co., Inc.
Bridgeport, Conn.

**GRINDERS • WHEELS
BUFFING LATHES**

Taylor "Hi-Eff" Mallet

Designed for use by aircraft and automotive plants, tool, die, and other shops where finely finished surfaces must



Taylor "Hi-Eff" Mallet

be protected, a no-mar mallet with head made of a special shock-absorbing material, to be known as the "Hi-Eff," is now being introduced by the Taylor

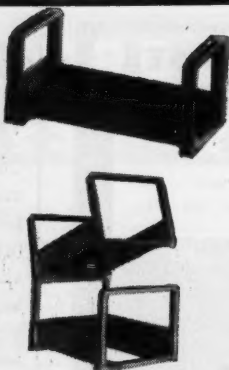
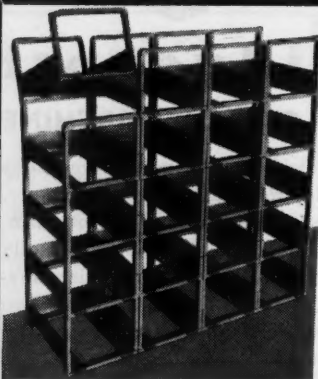
Mfg. Co., 3056 W. Meinecke Ave., Milwaukee 10, Wisconsin.

The Taylor Hi-Eff Mallet is available in three weights of 12, 18 and 24 oz. The heads of all three models, however, are of the same size, and no weighted cores are used—a feature which is said to make for ideal balance, unusual compactness, easy use, and long life.

Ess Model SS10 Soldering Stand

Embodying changes in design and construction to provide for greater protection against injurious fumes, hand fatigue, eye strain, and so on, an improved soldering stand designated as the Model SS10 has been developed by the Ess Specialty Corp., Dept. SS, Bergenfield, N. J. The stand is arranged to afford maximum freedom for passage of work and includes a magnifying or plate glass window which enables the operator to focus his attention on the soldered joint, thus increasing speed of soldering through the elimination of all lost motion.

The Ess Model SS10 Soldering Stand



UP-TO-DATE STORAGE

OF BOXES OF
Tools, Parts,
Materials

Every box is instantly accessible when you use STACKRACKS. Heavy containers slide in and out like drawers—you can get at the contents of any one quickly and easily without disturbing the others. Patented STACKRACKS, to fit your boxes, interlock to form storage units of any size, shape or capacity.

STACKBINS

Manufactured and sold in Canada exclusively by
Walter H. Wickware, Ottawa.
WRITE STACKBIN CORP., 53 TROY ST., PROVIDENCE, R. I.

STACKBIN

"Stacked and



SYSTEM

Still Accessible"



Get FREE SAMPLE! — TAMMS LAYOUT DOPE
Now offered in Blue, Black, Orange, Red!
 Speeds layout on all metals. Clean, accurate detail. Oil resistant. Won't chip, crack or flake off. Also ideal as a marking dye. Comes in 8 oz. brush-in cans, pts., qts., drums. Order NOW!

TAMMS SILICA COMPANY
 228-MS North LaSalle St. Chicago 1, Ill.



**DRILL and
 PILOT
 BUSHINGS**
*Frictionless
 —Rotary*

For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch. Write for details.

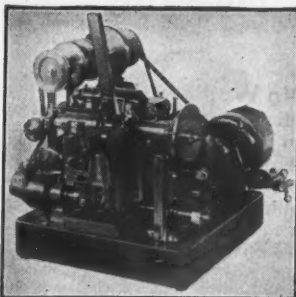
GIERN & ANHOLT TOOL CO.
 1312 Mt. Elliott Ave. Detroit, Mich.

WALTHAM

Pinion and Gear Cutting Machines

with revolving cutter will make 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1½" dia. Revolving cutter makes successive cuts on blanks held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut. Write for Bulletin No. 112.

WALTHAM MACHINE WORKS
 WALTHAM MASS.

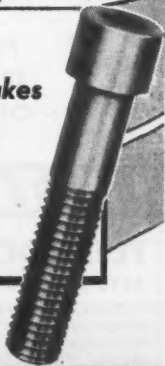


Why are *Mac-it's* used on Extra Tough jobs?



Because . . .
Mac-it Process makes
 them **STRONGER**
 more **UNIFORM**
 more **ACCURATE**

Mac-it Products Include: Socket Head Cap Screws, Hollow Set Screws, Hexagon Head Cap Screws, Square Head Set Screws, Stripper Bolts, Hexagon Socket Pipe Plugs



STRONG, CARLISLE & HAMMOND CO. • Cleveland 13, O.

THIS HEAVY DUTY FLOOR PATCH

**Takes Traffic
IMMEDIATELY**

No Wait for Drying

Here's a new, fast way to patch broken concrete without having to close off the area. Use durable **INSTANT-USE**... a tough, plastic material which you simply shovel into hole — tamp — and run traffic over immediately. **NO WAITING.** Bonds tight to old concrete. Make smooth, solid, heavy-duty patch. Keep a drum on hand for emergencies. Immediate shipment.

*Request Descriptive
Folder and Details
of*

**FREE
TRIAL
OFFER**



INSTANT-USE

FLEXROCK Co.

3615 Filbert St., Philadelphia 4, Pa.

Please send me complete **INSTANT-USE** information... details of **FREE TRIAL OFFER**—no obligation.

Name.....

Company.....

Address.....

is supplied complete with a cast bracket for mounting on assembly tables, or, if desired, can be supplied mounted on a wood base. The fume stack is 3 x 9 1/2 x 32 inches high. The shield is fitted with a plate glass window or, for small



Ess Model SS10 Soldering Stand

work, with a magnifying glass. The exterior of the hood is finished in black crackle, while the underside of the hood is finished in white to reflect all the light possible.

Best Tools No. 51 Lathe Angle Plate

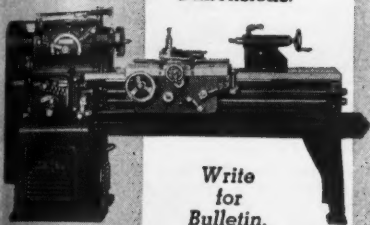
Designed to eliminate the need for special jigs and fixtures in performing intricate machining operations on a lathe, a lathe angle plate together with accessories is now being manufactured by Best Tools Corp., 482 Sunrise Highway, Rockville Centre, Long Island, New York.

Designated as the No. 51, the plate, which can be used on any 14 to 16-inch swing lathe, is positioned by a locating nose placed in the headstock spindle and is then bolted to the faceplate. It is equipped with an adjusting screw and the necessary gages so that, by the use of size blocks or calipers, work may

**CARROLL
AND
JAMIESON
LATHES
15" AND 16"**

**12 Speed Geared
Head Motor Drive
Timken Mounted
Spindle.**

**Modern Design—
Liberal
Dimensions.**



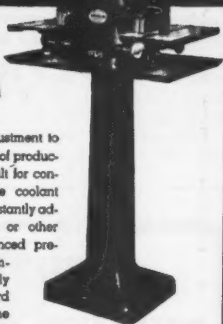
**Write
for
Bulletin.**

**THE CARROLL & JAMIESON
MACHINE TOOL CO.**

ATAVIA • OHIO, U. S. A.

**The CRITERION
Carbide Tool
Grinder**

**GREATER
PRODUCTION
CAPACITY**



Provides positive rapid adjustment to meet the rigid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third HP balanced precision bearing motor completely enclosed and radically mounted in rubber. Standard equipment: One 60 and one 100 grit 7" dia. steel backed silicon carbide wheels. Ideal for metal bonded or Resinoid bonded diamond wheels.

Order from your dealer or write direct. Request literature. No obligation.

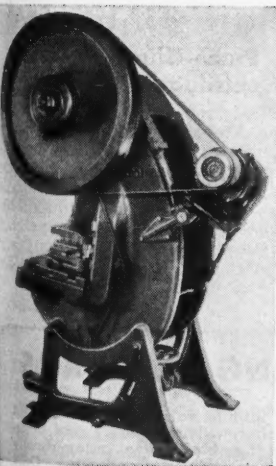
CRITERION
MACHINE WORKS
BEVERLY HILLS CALIFORNIA

**SPEED punching and
SAVE belting with
MASTERDRIVE**

How it speeds — High torque, high slip motors pick up the load with minimum shock. No slipping. Gear head motor reduces output shaft speed, permitting a large motor pulley and a high percentage of belt wrap.

How it saves — Use your present belting. Save rubber, and expense and delay of grooving pulleys. Belt failure will not capsize drive.

Drive easily mounted above or behind press. No interference with roll feed. Does not obstruct die removal through back of press. A single complete installation with Master Gear Head Motor — one responsibility. Write for details today!



MASTER ELECTRIC CO.
INDUSTRIAL EQUIPMENT DIVISION • DAYTON, OHIO

be located with a high degree of accuracy.

The Best Tools No. 51 Lathe Angle Plate is said to be particularly useful in offset radius turning, cutting eccentrics, angle boring, turning compound angles, and other operations not ordinarily considered as straight lathe work. It is claimed to be especially adapted to jig and fixture work where holes, straight or directional, must be held and spaced to close tolerances.

The several accessories available for the No. 51 lathe angle plate include

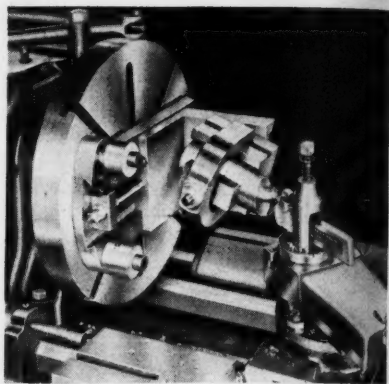
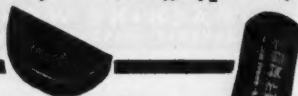


Illustration showing Best Tools No. 51 Lathe Angle Plate with special clamping device for holding round stock mounted on lathe for turning 20-deg. offset stud on large shaft held in fixture

WHITNEY MILLING CUTTERS

*for Uniform Seating of
Whitney Woodruff-type Keys*



No need for skilled labor... or for filing and fitting... when Whitney Milling Cutters are used for seating Whitney Keys. Cutters are made in all sizes to correspond with the keys which can't roll over. Complete information in Catalog V-111. Write.



The Whitney Chain & Mfg. Co.
HARTFORD, CONNECTICUT

clamping devices for holding various shapes of stock. The clamping accessory regularly furnished with the plate comprises a straight adjustable clamping saddle suited to the holding of cube stock up to 5 x 5 x 5 inches.

Brady "Pinch-Hitter" Portable Centrifugal Pump

A portable, self-priming centrifugal pump to be known as the "Pinch-Hitter" is now being introduced by the Brady Pump Co., Inc., Muncie, Ind. Designed for easy carrying in one hand, the pump includes a heavy duty, ball bearing motor and is sturdily constructed to allow for handling of abrasives of steel chips. It can also be used for cleaning sump or liquid transfer.



EXPANDING MANDRELS

Any size hole within a 1" range of infinite variation! That's what one size Champion Expanding Mandrel will completely and accurately handle. The hardened steel flexible sleeve automatically expands to the correct size as it is raised on the tapered arbor. Only 12 champions needed for range from 1/2" to 6 1/2". Eliminates numerous solid mandrel sizes. More convenient. Costs 2/3 less. Proved for years by thousands of shops.

**THE WESTERN TOOL
and Manufacturing Co.**
SPRINGFIELD, MASS.



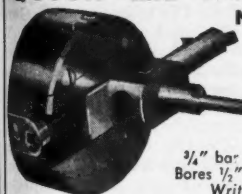
TRICO OILERS



- STOP GUESSWORK
 - END BEARING FAILURES
 - SAVE OIL-TIME-WORRY
 - MODERNIZE EQUIPMENT
- Many Styles and Sizes
WRITE FOR CATALOG.

TRICO FUSE MFG. CO.
MILWAUKEE WISCONSIN

QUICK and ACCURATE



No. 35 FLYNN

MICROMETER
OFFSET
BORING HEAD
HAS RIGIDITY
PLUS A
Large Range
2" OFFSET

3/4" bar or tool capacity.
Bores 1/2" to 12" dia. holes.
Write for catalog.

FLYNN MANUFACTURING CO.

437 Bates St.

Detroit, Mich.

Diamond Tool

COST CONTROL

The Koebel Library of Conservation Information is available to help reduce the ultimate cost of your diamonds. Practical employee training literature on how to use diamond tools. Write today for details.



KOEBEL

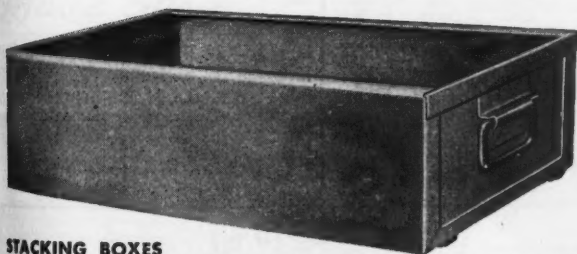
**FIRST TO SET DIAMONDS
IN POWDERED METAL**

KOEBEL DIAMOND TOOL CO.

9450 Grinnell Ave., Detroit

IMMEDIATE SHIPMENT!

STEEL BOXES



**for your
Production
Needs**

STACKING BOXES

Just right for your small parts. Light in weight, easy to handle. Equipped with drop handle each end. Runners save wear on bottom of box and act as positive stacking lock.

No. 301—6" x 9" x 3 1/2"	— 20 Gauge	\$.35
No. 302—8" x 12" x 4"	— 20 Gauge	\$.60
No. 303—9" x 13 1/2" x 4 1/2"	— 19 Gauge	\$.75

Prices F. O. B. Factory, Philadelphia

AMERICAN METAL WORKS, INC.

1301 GERMANTOWN AVENUE

PHILADELPHIA 22, PA.

The Brady Pinch-Hitter Portable Centrifugal Pump has a capacity for de-



Brady "Pinch-Hitter" Portable Centrifugal Pump

livering 1,200 gallons of water soluble oil per hour, 1,000 gallons of light oil per hour, and 600 gallons of heavy oil

(40 S. A. E. maximum) per hour. The pump can be arranged to handle four discharge nozzles which can be regulated to provide a discharge of a single drop per minute to full flow. The unit is supplied complete with motor, cord and plug, suction and discharge hose, and one nozzle.

General Electric CR7503-D157 Electronic Control

Designated as the CR7503-D157, an electronic voltage regulator for use with most G-E resistance-welding controls incorporating the phase-shift method of heat control has been announced by the Industrial Control Division of the General Electric Co., Schenectady, N. Y. The unit is designed to regulate welding current automatically so that it is held constant regardless of line-voltage variations of as much as plus 10 or minus 20 per cent.

The General Electric CR7503-D157 Control consists of a resistor circuit connected to the power line which supplies the welding machine, and an electronic circuit. When the regulator is in use the electronic circuit functions not only

H.S. COMBINED DRILL & COUNTERSINK



Size	Diam. of Drill	Price per Doz.	Diam. of Body	Decimal Equiv. of Drill	Size	Diam. of Drill	Price per Doz.	Diam. of Body	Decimal Equiv. of Drill
A1	3/64	\$ 8.00	1/8	.0468	J1	7/32	\$18.00	1/2	.2187
C2	1/16	8.00	13/64	.0625	J2	9/32	18.00	1/2	.2187
D1	5/64	8.00	15/64	.078	M1	7/32	24.00	5/8	.2187
E1	3/32	8.00	3/10	.0938	M2	9/32	24.00	5/8	.2187
E2	1/8	8.00	3/10	.125	N1	1/4	32.00	3/4	.250
F1	5/32	12.00	7/16	.1563	N2	5/16	32.00	3/4	.3125
F2	3/16	12.00	7/16	.1875					

(LIST LESS 10%)

We carry a complete line of Drills, Taps, Dies; also special Taps and Dies, Milling Cutters, Lathe Tools, Mechanics' Precision Tools, etc.

Write for Our General Catalog

Priorities Must Accompany All Orders

CENTER TOOL CO. *Machine Shop Equipment*
151 CENTRE ST., N.Y. 13

ANNOUNCEMENT

ALUMINUM HANDLES
American Gage Design

NOW MADE IN COLORS

**Gold, Blue, Black
Maroon**

Delivery From Stock

ALSO

THREAD MEASURING WIRES
LAPPING COMPOUNDS
GAGE RUST PROOFING
GAGE BLOCKS
PLUG GAGE BLANKS
RING GAGE BLANKS
TRILOCK GAGE BLANKS

**AMERICAN GAGE MAKERS
SUPPLY CO.**

11706 Woodward

Detroit 3, Mich.

*Leveling
Made Easy!*

4 sizes: 2 3/4", 3 3/4",
3 1/2" and 7 1/2" closed
heights. Self-leveling
ball and socket cap.



Simplex Machinists'
Jacks cut costs by speed-
ing leveling of work on
planers, milling machines
and other tools. Side
lock nut holds screw at
desired height. No. 3A, 3' high, is extended
further by inserting 1" pipe in base or 1 1/2"
pipe in cap. Ask your dealer.

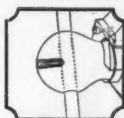
Templeton, Kenly & Co.
Chicago 44, Ill.

Better, Safer Jacks Since 1899.

Simplex
LEVER - SCREW - HYDRAULIC
Jacks



OUR
HANDLES
STAY
PUT



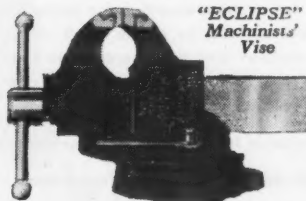
Tension spring
holds handle in
any position.



Use
vises
that
won't
pinch
WORKERS'
HANDS!

Because the handle is held securely, in any position, by an adjustable tension spring, it cannot slide down accidentally and pinch the operator's fingers. This exclusive feature means better satisfied workers and less loss of time from accidents. It also permits faster work. By centering the handle the screw can be turned in or out more quickly.

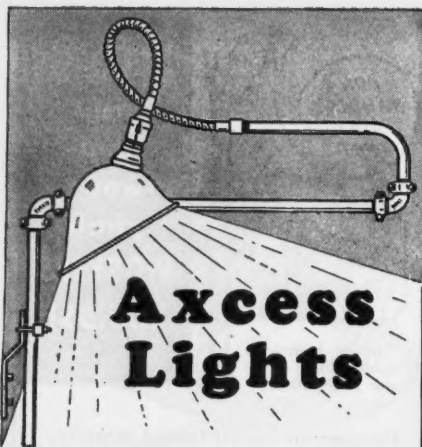
Other features of Parker Vises add to their utility and efficiency. Jaws are tool steel and cover the entire top of the vise, readily replaceable; the under portion of the slide is a solid casting; an oversized screw and nut are used. The Charles Parker Company, Meriden, Conn.



"ECLIPSE"
Machinists'
Vise

**PARKER
VISES**

America's Oldest



Vital for Precision Work

With but five basic parts and three variables, you can have what it takes for bench machine to huge tools of production.

Adjustable to any angle, to reach any recess.

Long enough to reach
Stable enough to stay put
Rugged enough for long use

Shades combining light of the sun and blue sky — those essentials for shade and shadow so vital to define small shapes and contours and strong enough to overcome the confusing brightness of other light sources and its reflections.

Available in complete units or parts.

Write for complete information

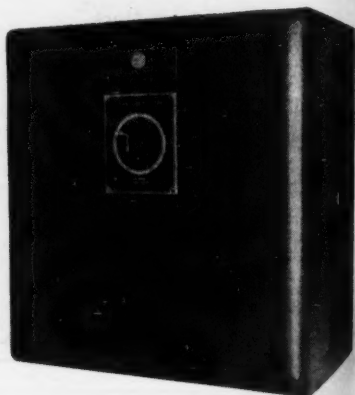
★ ★ ★

Sampson Axxess System

Incorporated

7 Liberty Square, Lynn, Mass.

to hold the average voltage of the resistor current constant, but also changes, electronically, the phase control voltages of the main welding control panel. Thus, if the line voltage drops, which normally would cause the current through the welding transformer and the voltage of the resistor circuit to vary correspondingly, the regulator advances the phase control voltages, thereby automatically holding the welding current constant within close limits.



General Electric CR7503-D157 Electronic Control

The regulator, which is housed in a sturdy easily-opened steel enclosure, can be used on welding circuits, each having a power factor from 20 to 70 per cent, and can be operated from 230/400/575 volts on a 50/60-cycle power supply. According to the manufacturer, the regulator is designed to operate whether or not the welding current is flowing thus enabling it to compensate for a sudden voltage drop in less than three cycles, with approximately 75 per cent of the compensation taking place during the first cycle.

"Flexloc" Lock Nut

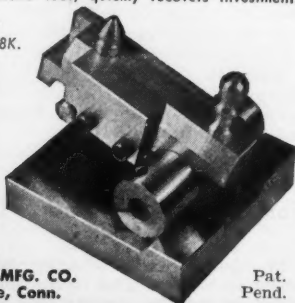
A unique lock nut made in one solid piece from top to face, to be known as the "Flexloc," is now being offered by the Standard Pressed Steel Co., Box 556, Jenkintown, Pa. In addition to being a lock nut, the Flexloc can also be used as a stop nut since it not only resists backing off when seated but is made

Sine

ANGLE WHEEL DRESSER

For faster, easier, more accurate dressing of surface grinder wheels...any angle 0° to 90° at plus or minus 10 seconds. Precision diamond tool, quickly recovers investment.

Send for
Bulletin 758K.

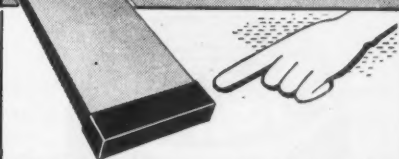


Made by
FLORIAN MFG. CO.
Plantsville, Conn.

Pat.
Pend.

DISTRIBUTED BY
AMERICAN STANDARD CO.
SOUTHINGTON, CONNECTICUT

Here's Why FORTHMAN SCRAPERS
provide FINER FINISHES FASTER!



Forthman Scrapers are tipped with super-hard CARBOLÖY CEMENTED CARBIDE to resist wear and hold keen cutting edge over longer periods of continuous use! In terms of user benefits, this means

- ... longer scraper life!
- ... fewer interruptions for sharpening!
- ... finer finishes faster!

Furnished ground or unground. Write today for prices and specifications.

Manufactured by

CLIFF J. FORTHMAN

1633 Elkton Place • Cincinnati 24, Ohio



The UNUSUAL LUERS Patented Threading Tool enables you, MR. MECHANIC, to chase threads—**BETTER THREADS—from 25% to 50% FASTER.**

WHY?

Ask for a circular.

MANUFACTURED
BY

J. MILTON LUERS

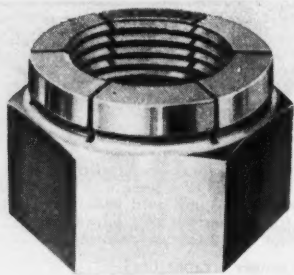
12 PINE ST.

MT. CLEMENS, MICH.

Produced under License issued by John Milton Luers Patents Inc.

to be equally impervious to shaking loose regardless of where it may be placed on a bolt or threaded bar.

The top of the nut has six radial slots, providing an equal number of sections



"Flexloc" Lock Nut

which do the actual locking—a design which in a measure resembles that of a chuck only that in the Flexloc the "jaws" or sections are flexible and resilient so that they can adapt themselves to a wide range of tolerances

without the torques varying to any great extent. The construction of the resilient sections is such that the torques they develop can be easily adjusted and thereby predetermined within reasonably close limits.

The Flexloc Nut is said to be especially suited where studs instead of bolts must be used since it will not take the stud with it when backed off. According to the manufacturer, the nut is not affected to any great extent by heat or cold within the limits to which it is likely to be exposed.

The Flexloc Lock Nut is available in a complete range of sizes and can be made from any of the conventional nut materials, such as steel, brass, bronze, and aluminum.

Norton Vitrified Bonded Diamond Wheel

The development of a vitrified bonded diamond wheel for grinding carbide tools, as well as quartz crystals, porcelain, and similar materials, is announced by the Norton Co., Worcester 6, Mass. The outstanding feature of the

Don't Scrap
**THOSE TAPS
AND
REAMERS!**

**MANY ARE
STILL PERFECT!**

Before throwing away taps and reamers that you think are causing over-size or bell-mouthed holes, test them in a Ziegler Floating Holder. You'll find that many of them are still good for a long period of service.

Many a tool performs a faulty job, not because the tool itself is faulty but because the set-up is faulty. The Ziegler Holder, by correcting inaccuracies in spindle alignment of as much as 1/32" radius or 1/16" diameter, makes all such alignment troubles quickly vanish.

The taps and reamers that you have been discarding long before they are worn out will pay for a Ziegler Holder many times over in the course of a year. That's why a Ziegler Holder is such a good investment!



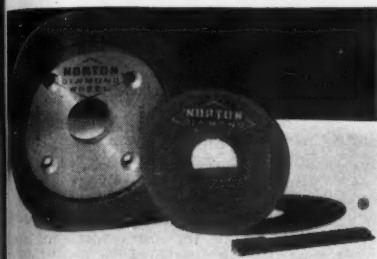
W. M. Ziegler Tool Co.

Ziegler
ROLLER
DRIVE
FLOATING HOLDER
for Taps and Reamers...

1924 TWELFTH ST.
DETROIT 16, MICH.

WRITE FOR
CATALOG

wheel is the combination of a fast-cutting action with extremely long life. The ability of the Norton Vitrified Bonded Diamond Wheel to hold a sharp



Norton Vitrified Bonded Diamond Wheels and Hand Hone

corner is said to make it particularly adaptable for chip breaker grinding. Another important advantage is the ability of the wheel to grind shank steel with little tendency to glaze or load. This characteristic is said to be of particular importance where a relatively large area of steel must be ground with

the carbide tip, as in the case of cutter blades.

The Norton Vitrified Bonded Diamond Wheel is available in 4 and 5-inch diameters. Vitrified bonded diamond hand hones are also available from the company.

Aro Model 106 Impact Wrench

The Aro Equipment Corp., Bryan, Ohio, announces the addition of a ¼-inch capacity impact wrench designated as the Model 106 to its line of pneumatic impact tools. Operating with controlled torque, the wrench is designed to completely eliminate stretching or "burning" of threads in setting nuts, bolts, or screws. It is capable of both forward and reverse rotation and has a calibrated adjusting screw on the side of the motor which enables the operator to set bolts, nuts and screws to any desired tension.

Torque control is obtained through a roller clutch impact mechanism consisting of only four parts. The action of the impact mechanism is such that while the wrench drives the screws to



CRITERION Boring Heads

Original Accuracy Maintained

Noted for maintaining original accuracy over a longer period Criterion Heads are smooth, compact, rigid. Parts subject to wear are hardened. Lead screw is hardened tool steel, with threads ground from solid after hardening. All heads have large, graduated dial. Large offset adjustment eliminates need for offset boring bars. Two sizes: 1½" and 3". ½" and 1" bar capacity. Shanks are interchangeable, enabling operator to use head on different machines. Ideally adapted for slide boring tool holder on small turret lathes. Ask your dealer or order direct. Request free literature.



CRITERION MACHINE WORKS
BEVERLY HILLS, CALIFORNIA

Lead Screw
Ground from
Solid AFTER
Hardening.



Aro Model 106 Impact Wrench

the desired tightness, it will not, the manufacturer states, tear the heads of the screws or break the bits. The wrench is said to be particularly desirable for use in driving Phillips, Reed and Prince, or Allen screws.

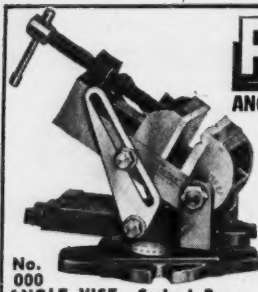
The Aro Model 106 Impact Wrench

has a maximum capacity of $\frac{1}{4}$ -inch bolt size, an overall length of $7\frac{1}{2}$ inches, spindle offset of $1\frac{1}{2}$ inches, $\frac{3}{8}$ -inch square drive, and weighs $2\frac{1}{2}$ lb. It is supplied complete with one socket and 8-foot $\frac{1}{8}$ -inch hose together with fittings.

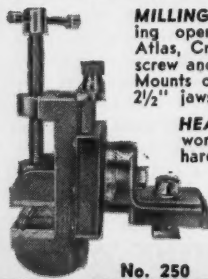
Mercury Interchangeable Type Holder

An interchangeable type holder which is designed to accommodate four type sizes and up to 20 characters has been developed by Mercury Metal Die & Letter Co., 546 E. 16th St., Los Angeles 15, Calif. The holder is said to speed part marking operations by enabling the user to stamp the entire number desired on a part with a single blow of a hammer. According to the manufacturer, the holder is so constructed that type cannot be placed in it upside down, and all type is rigidly held in alignment so that part numbering is neat and fully legible.

The Mercury Interchangeable Type Holder consists of three parts—body, anvil, and release button. The anvil, containing the type, is slidably connected to the body so that it can be



**No. 000
ANGLE VISE—Swivel Base**



**No. 250
MILLING ATTACHMENT
VISE—2 1/2" JAWS**

PALMGREN

ANGLE-DRILL PRESS-PRODUCTION VISES

ANGLE VISES—For Milling, Drilling, Grinding, Filing, Fitting, etc. Solve difficult angle jobs. Quick accurate set-ups without clamps, wedges or make-shift methods. Accurately machined and graduated. Hardened steel jaws, plain or grooved. $1\frac{1}{2}$ " to 8".

DRILL PRESS VISES—Accurately machined. Best semi-steel castings. Long bearing and adjusting screw. Jaws hardened steel—plain or grooved. Sizes $1\frac{1}{2}$ " to 4".

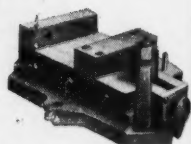
MILLING ATTACHMENT VISE—Just the fixture for milling operations on lathes. Fits 8"-9"-10" South Bend, Atlas, Craftsman, Sheldon, etc. Graduated vertical feed screw and 360° graduation for vertical angle adjustments. Mounts on cross slide and held by T-slot bolt. Vise has $2\frac{1}{2}$ " jaws 1-7/16" deep grooved and plain. \$24.75.

HEAVY DUTY PRODUCTION VISES—For fast, heavy work. Adjustable cam locking lever. Movable jaw, hardened and ground. Sizes 3" to 8" Jaws.

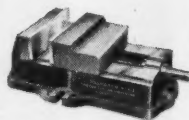
FLANGED MILLING MACHINE VISE—Clamps to table of milling machine, grinder, etc. Jaws hardened and ground. 6" wide, 2" deep.

Write for Circular 348

CHICAGO TOOL AND ENGINEERING CO.
Mfrs. of Palmgren Products for Over 25 Years
8399 South Chicago Ave., Chicago 17, Ill.



**HEAVY DUTY
PRODUCTION VISE**



**FLANGED MILLING
MACHINE VISE**



DRILL PRESS VISE

1/4-inch
inches,
3/8-inch
It is
et and
with fit-

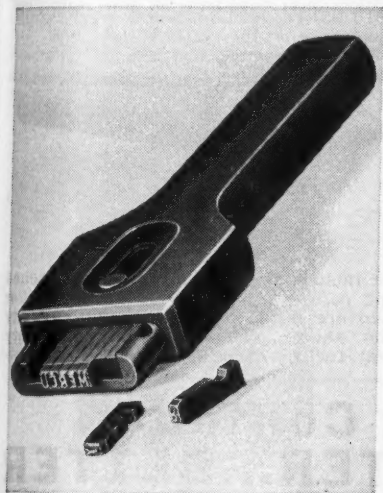
Type

which
r type
s been
& Let-
eles 15,
speed
ing the
er de-
low of
unufac-
that
down,
align-
s neat

Type
body,
anvil,
y con-
can be

opened and closed by simply pressing the release button. When opened, the type can be quickly placed in proper sequence in the holder. By merely pulling back on the release button, the anvil is slid back into the holder and locked firmly, thereby holding the type rigidly in place, ready for marking the parts.

All parts of the holder are of machined steel construction and are amply rugged to withstand continuous use.



Mercury Interchangeable Type Holder

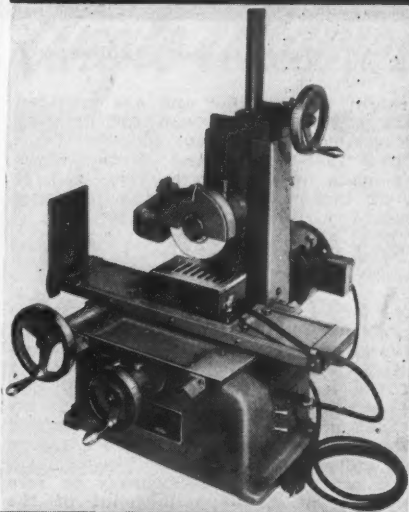
The compact design of the holder allows for its use in accurate and legible marking in restricted areas.

The Mercury Interchangeable Type Holder is supplied complete with hardened and ground steel type which is hand cut for sharpness and long life and is available in four standard sizes to meet a wide range of marking requirements. The holder is also available with a shank to fit hand, arbor, or kick presses, as well as in the hand model shown.

Taft-Peirce Steel Straightedges

The Taft-Peirce Manufacturing Co., Woonsocket, R. I., is now marketing a line of steel straightedges of suitable proportions. The straightedges are hardened, drawn, and accurately ground

SANFORD



**HIGH SPEED
BENCH
SURFACE GRINDER**

ACCURACY WITHIN .0001

A sensitive, highly accurate,
machine specially designed

*"For The Job That
Fits in Your Palm"*

Prompt Delivery

Write for Bulletin

Available on M.R.O. Certifications

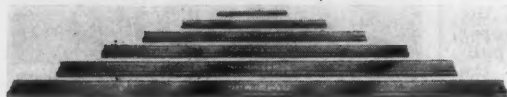
SANFORD MFG. CO.

1279-81 SPRINGFIELD AVE.

IRVINGTON 11, NEW JERSEY

January, 1945

MODERN MACHINE SHOP 343



Taft-Peirce Steel Straightedges

straight and parallel and are provided with a hole in one end for hanging up vertically when not in use.

The Taft-Peirce Steel Straightedges are made in six sizes ranging from 12 to 72 inches in length and weighing from 1 to 36 lb. respectively.

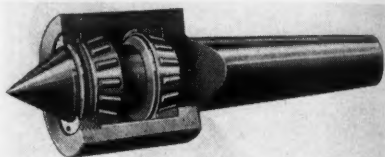
"Roto-Center"

Positive elimination of chatter is an outstanding feature claimed for the "Roto-Center" shown herewith, product of the Falls Products Co., P. O. Box 64, Milwaukee, Wis. The center is intended primarily for use in grinder and lathe tailstocks where high work speeds are employed.

In order to obtain accuracy or zero eccentricity, the spindle point of the Roto-Center is ground in its own bear-

ings after assembly. Removal of all internal play and the preloading of bearings through a threaded retaining ring prevent chattering, it is claimed. The provision of compensation for bearing wear by tightening up on the retaining ring makes possible the sustaining of initial preloading and non-chattering rigidity throughout the life of the center, the manufacturer states.

Additional features of the Roto-Cen-



"Roto-Center"

ter include the use of carefully matched and paired high precision Timken roller bearings for high load carrying capacity and shock resistance; a heavy duty seal for repelling chips, dirt, and cut-

GRIND Difficult Contours and Profiles FASTER...BETTER



Boyar-Schultz No. 1 Profile Grinder replaces slow hand work in fitting dies and punches, grinding die clearances and odd shapes encountered in cams and templates.

High speed of 20,000 assures efficient grinding, even with $\frac{1}{8}$ " diameter wheels.

New serrated top table permits smooth movement of work and grinding to closer tolerances.

Write for new circular.

BOYAR - SCHULTZ CORP.
2120 Walnut St. Chicago 12, Ill.

ing oil; induction hardened parts; and grease lubrication. The center is standardly available with a Morse taper shank. Centers with special shanks and in special sizes are available on order.

G-E Outdoor A. C. Welders

Two outdoor alternating current welders, a 500-ampere type and a 300-ampere type, are announced by the Electric Welding Division of the General Electric Co., Schenectady, N. Y. The 500-ampere welder has a current range from 100 to 625 amperes, while the range



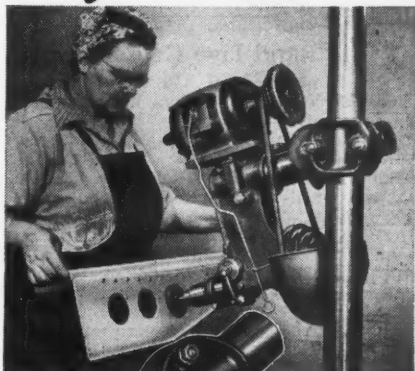
G-E Outdoor A.C. Welder

of the 300-ampere welder is from 60 to 375 amperes. Both welders are specifically designed for use in shipyards and similar outdoor locations where exposure to the weather is common.

Each G-E Outdoor A. C. Welder is equipped with an "idlematic" control which functions to reduce the output voltage automatically to less than 30 volts whenever the arc is not in operation, yet provides full power for welding directly when the arc is struck. In addition, the control includes a switch, conveniently operated by a handle projecting through the top of the case, for shutting off the welder when not in use.

Protection against the entrance of rain, snow, and sleet is provided by the drip-proof construction of all openings in the top of the sturdy enclosure of each welder and by a sealed window over the current indicator. The ventilating openings serve both to shed

NEW Angle Adaptor



Converts any drill press into a versatile multi-purpose machine.

Permits any spindle angle . . . at any height . . . horizontally or vertically.

Simplifies clumsy operations . . . speeds production . . . eliminates operator fatigue.

Makes burring, sanding, buffing, grinding, angle drilling, polishing, rotary filing, wire brushing, tapping, reaming, honing, etc., more convenient, twice as fast!

Adaptable to all drill presses with tubular columns . . . rigid construction . . . **POSITIVE LOCKING.** Write now for descriptive literature, details.

NOBUR MANUFACTURING CO.

910 North Orange Drive
Los Angeles 38, California

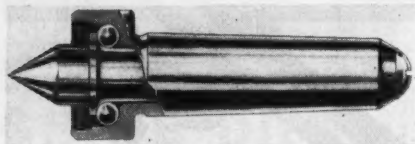
water and to keep air velocity low. A special finish on all internal parts provides protection against corrosion from moist air.

Additional features of the G. E. Outdoor A. C. Welders include built-in power-factor improvement, finger-tip adjustment, stepless current control, and fan-forced ventilation.

Rigid Live Center

The Empire Tool Co., 8790 Grinnel Ave., Detroit, Mich., has been appointed exclusive distributor of the Rigid Live Center now being manufactured by Aeronautical Products Inc., Detroit, Mich., and Washington Court House, Ohio. The center has its ball race ground in the housing, thereby eliminating many separate parts and assuring accuracy which is said to be within 0.0002-inch tolerance.

According to the manufacturer, the Rigid Live Center will not bind even



Rigid Live Center

with heavy loads, and is designed to run true under all conditions. Because of the short overhang, unusually close working to the part is permitted and there is less vibration and greater rigidity, it is claimed. A patented rawhide seal in the head prevents loss of lubricant and prevents foreign matter from getting inside. This feature, together

with the Oillite bearing in the shank, is said to assure constantly cool, smooth operation under heavy loads. A Zerk fitting facilitates greasing without disassembly.

The Rigid Live Center is made in sizes to fit Morse, Jarna, and Brown & Sharpe tapers, and also with straight shanks.

State Four-Cutter Tools

Cutting tools each having four bits inserted at 30-deg. angles are now being made by the State Manufacturing &



State Four-Cutter Tool

Construction Co., Franklin, Ohio. The inner end of each bit impinges upon a finely threaded screw whereby the bit can be protruded for regrinding or for machining a hole of larger diameter. The bits are held firmly in position by individual set screws.

Made in a variety of standard sizes with fluted or plain bodies, State Four-Cutter Tools range in cutting diameters from $\frac{3}{4}$ to $4\frac{1}{4}$ inches and are normally used for hogging, counterboring, finish drilling, and reaming. The clusters of bits can be expanded in circumference $\frac{1}{8}$ inch in the smallest model to $1\frac{1}{4}$ inches in the largest model for increasing the cutting diameters.

Special models to meet user requirements can also be obtained. These incorporate duplex heads for cutting two

GROBET SWISS FILES



5000 SHAPES AND SIZES
GROBET SWISS FILES

Genuine Grobet Precision Swiss Files are world famous for utmost precision and durability since 1812. Learn more about these chrome steel files—send for Catalog KF, the most complete of its kind.

GROBET FILE CO. OF AMERICA
421 Canal St. • New York 13, N. Y.

shank,
smooth
Zerk
ut dia-

ade in
Brown
straight

ur bits
being
ing &

The
upon a
the bit
or for
meter.
ion by

sizes
Four-
meters
rmally
finish
ters of
erence
to 1¼
increas-

require-
ese in-
g two

s are
and
about
steel
Cata-
com-
h.

ERICA
N. Y.

y, 1945

or more diameters, pilots, collars, fac-
ing bits, wear strips, center oil holes,
and so on.

Republic "Shankless" High Speed Twist Drill

A high speed drill with continuous
flute, produced by roll forging and hot
twisting and driven by a removable
taper shank, is now being manufactured
by the Republic Drill & Tool Co.,
135 S. La Salle St., Chicago 3, Ill.



Republic "All-Flute" Straight Shank Drill
Gripped in Conventional Drill Chuck

The neck or driver end of the drill is
toughened by proper heat treatment so
that it will "give" slightly under se-
vere torsional strain, thus greatly re-



Republic "Shankless" High Speed Twist Drill
Equipped with Driver

ducing the possibility of drill breakage
on the more difficult drilling jobs.

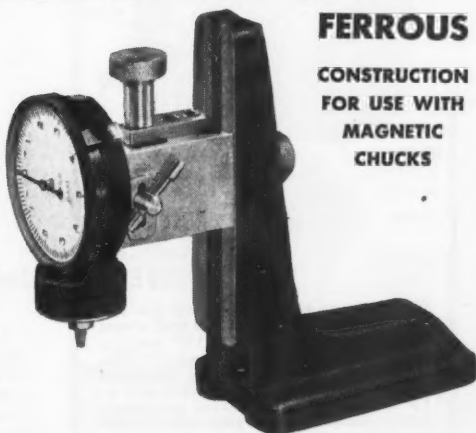
The Republic "Shankless" High Speed
Twist Drill is made in 135 sizes from
¼ to 2 inches in diameter. Only seven
sizes of drill drivers (No. 1 to No. 5
Morse taper) are required for driving
the 135 different sizes of drills.

The company is also offering an "All-
Flute" High Speed Straight Shank Drill
which is produced by the same roll-forg-
ing and hot-twisting processes as are
used in making the Shankless Drill.
The All-Flute Straight Shank Drill is

NEW MODELS including NON

BARTELT PEDESTAL INDICATORS FOR TOOL SETTING

New Model "D" Bartelt Pedestal In-
dicators are designed for gaging from
flat surfaces such as machine tables,
surface plates, magnetic chucks, and
the like. For approximate setting,
the carriage block is clamped where
desired on the upright, and the dial
indicator is then adjusted to exact
position on the face of the carriage
block with a micrometer screw, and
clamped separately. Model "DNF-10"
is made of non-ferrous metals for
freedom of movement in a magnetic
field. Model "DF-10" is made of
iron and steel for all conventional
uses. Write today for prices and full
particulars.



**FERROUS
CONSTRUCTION
FOR USE WITH
MAGNETIC
CHUCKS**

BARTELT ENGINEERING CO.

1216-A Partridge Avenue
BELOIT WISCONSIN

available in sizes from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter and can be used in all standard drill chucks without the use of special holders. The straight shank end of the All-Flute Drill is produced by giving that end of the fluted section an extra twist, which causes the spiral flutes to be compressed so that the shank can be gripped firmly in any standard drill chuck.

"Barel-Cel" Plating Unit

To meet the demand for a small compact barrel plating unit, Precimet Laboratories, 64 Fulton St., New York 7, N. Y., has recently placed on the market a two-gallon barrel plating unit known as the "Barel-Cel." Although originally designed for the plating of precious metal, it is also being used satisfactorily in copper, nickel, brass, and silver plating.

The Barel-Cel is simply constructed; it consists of an adjustable cathode and anode, and a tilted tub which rotates slowly during the plating operation. The power unit electric motor can be plugged into any convenient outlet; no special wiring is necessary. The

plating current supply to the unit is furnished by means of two wire leads that are fastened to the plating current bars. A special feature of the construction is the tub, which is removable to permit flexibility in handling the solution, such as raising it to the proper temperature before plating.

The Barel-Cel is particularly suited to the plating of such small pieces as



"Barel-Cel" Plating Unit



FOOT
CONTROL
SWITCH

**STREAMLINED
4-SPEED
REAMER
DRIVER**

Complete with motor . . . 4" four-jaw universal machine tool chuck and foot control switch. Capacity from $\frac{1}{4}$ " to $1\frac{1}{2}$ " reamers. Four speeds . . . 30—45—72 and 115 RPM. Higher speed ranges available. Eliminates handwork. Speeds production. Mail your order today. The new Greaves streamlined reamer-driver will come your way— pronto!



THE Greaves MACHINE TOOL CO.

2007-2 R. D. Eastern Ave.
Cincinnati, Ohio



springs, catches, rings, ear wires, pins, and screws. Perhaps the outstanding advantage of the Barel-Cel is its small size.

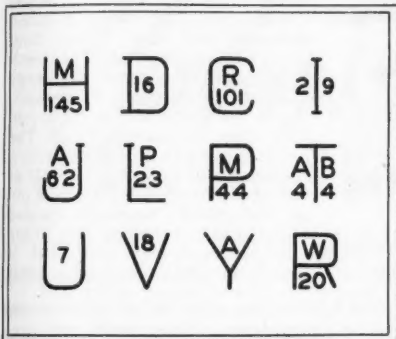
New Method Letter-Outline Hand Stamps

Letter-outline hand stamps which are said to be particularly suitable for use where several sub-contractors may be making the same parts and shipping them into the contractor's plant in quantities are now available from New Method Steel Stamps, Inc., 149 Joseph Campau St., Detroit 7, Mich. With the stamps, it is not only easy to identify the company which supplied the parts, but also the individual operator or inspector responsible for their production.

the unit is
fire leads
ing cur-
e of the
h is re-
handling
it to the
lating.
sited to
pieces as

All such information can be included on one hand stamp by a design which utilizes a large initial letter as an outline while other designations as to operator and operation performed on the part are contained within that character outline. The flexibility of the design permits variations to meet the ever-changing needs of industry.

The New Method Letter-Outline Hand Stamps are available in a variety of sizes to suit the particular needs of the individual manufacturer. Shanks are made either plain, or knurled for thumb and finger gripping. All letters, out-



Samples of designations which can be produced with New Method Letter-Outline Hand Stamps

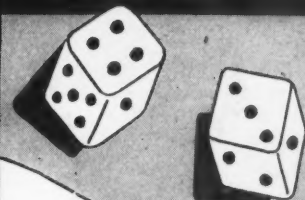
lines, and designs include the exclusive "Newco" bevel which is said to ensure long life and clear marking. The tapered and rounded head prevents peening and dangerous chipping under heavy blows, it is claimed. Each stamp is tempered by modern heat-treating methods, the upper portion of the shank bearing a characteristic temper color, indicating that it has been given the correct degree of hardness to best retard mushrooming.

Barnes Rotary Pump

A low pressure rotary pump which is said to afford an efficient and economical method for pumping all types of liquids having lubricating qualities has been announced by the John S. Barnes Corp., Rockford, Ill. According to the manufacturer, the pump is ideally suited for use as a lubricating booster

January, 1945

DON'T GAMBLE



PRODUCTION DELAY COSTS REAL MONEY!

When any machine goes "Down for Repairs" your production "Jams Up." To get that machine running again may cost only a few hours delay, but—the production lost can mean thousands of dollars.

Loss of Profits and Loss of Production Can Never Be Made Up!

Invincible angle tool attachments greatly reduce loss by reaching broken parts without dismantling the machine.

Invincible angle tool attachments make your portable drills universal for any operation by converting them into angle tools in a few minutes.



INVINCIBLE TOOL CO.

6111 Empire Bldg., Pittsburgh 22, Pa.

Makers of Job Tested and Job Proven Tools

MODERN MACHINE SHOP 349

es, pins,
standing
ts, small

Hand

which are
for use
may be
shipping
plant in
om New
Joseph
With the
identify
e parts,
or in-
duction.

ary, 1945



Barnes Rotary Pump Disassembled

pump for oil lines, a gasoline dispensing pump, and for oil pressure systems on automotive, truck, or tractor equipment. It can also be used on torque converters.

The Barnes Rotary Pump has a capacity which ranges proportionately from 1 gallon per minute to 600 r. p. m. to 4 gallon per minute at 2400 r. p. m. It has a high volumetric efficiency, pumping extremely low viscosity fluids.

An outstanding feature of the pump is the patented spur gear tooth form, which is said to eliminate excessive sliding and reduce slippage of the fluid to an absolute minimum. Each tooth completely fills the mating space as the gears mesh, and a perfect sealing action is claimed to be effected.

Protection against excessive pressures is afforded by a relief valve which is adjusted and set at the factory under

operating conditions simulating those of the plant in which the pump is to be installed. Complete balance is effected by equalized fluid pressure throughout the pump, which can be supplied with or without a relief valve.

The vacuum created by two identical precision-cut spur gears (the only moving parts) draws the fluid being pumped through the inlet. The fluid then passes between the teeth of the gears to the discharge side of the pump. The meshing of the gears forces the liquid into the discharge line. The driving gear is equipped with a free-floating type drive shaft of fine grained steel with shear pin to minimize damage caused

by foreign material's entering the pump housing. A spring-loaded oil seal is used on the drive shaft, and the shaft is tanged to fit the power drive slot.

The gears are cast integral with the shafts themselves. The shafts are precision machined to bearing limits to rotate in the bore in the pump housing, which is also cast from a special alloyed iron.

Self-priming is a feature of the Barnes Rotary Pump, and all moving parts are self-lubricated. The pump is precision machined throughout and can be easily assembled and taken apart; socket head screws are used in the assembly. The pump can be bolted onto any machine in positions to suit the power take-off. The maximum pressure range of the pump is 200 lb. per sq. in. Weight complete, 3½ pounds.

Produce with **SAFETY!**

It pays to protect your operators by equipping your punch presses with

STRAND Enclosure Safeguards

Easily installed. Adjustable to any size die. Quickly changed for any set-up. Write for circular.

STRAND MFG. CO., INC.

SAFETY ENGINEERS

611 West Lake Street

Chicago 6, Ill.



INDUSTRY'S FIRST CEMENTED CARBIDE ROTARY FILES

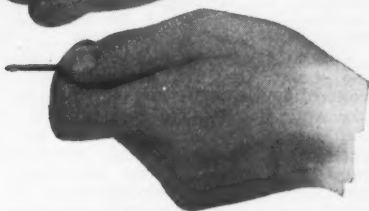
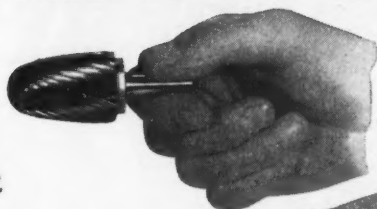
LARGE

or

SMALL

Carburs

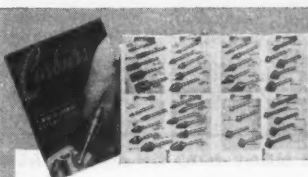
TO MEET YOUR PARTICULAR REQUIREMENT



Do YOU have a particular

burring or filing operation that requires an unusually large or small size Carbur . . . or one of a specially designed shape? Lincoln Park can supply it promptly for, in addition to producing twelve standard shapes—each in from four to six sizes and from fine to coarse cut—Carburs' facilities are set up to turn out Carburs in almost any shape or size to your special order.

The result of long research and development work in the grinding and forming of cemented carbides, Carburs have fully proved their ability to offer at least fifty times the tool life of steel rotary files. They retain a sharp cutting edge over a long period of time . . . because of their free cutting action, greatly reduce operator fatigue . . . can be run at much higher speeds, reducing finishing time per part materially . . . and consistently increase efficiency in rotary file use.



WRITE for your copy of Carburs booklet with illustrations, description and prices of all standard size tools. . . . It's yours for the asking.

Prices on special shapes and sizes of Carburs to meet your specific needs may be had on request. It is important that dimensions and full details of your special requirements be given us when writing.



LINCOLN PARK INDUSTRIES, INC.

Successor to The Lincoln Park Tool and Gage Company and Carbur, Inc.

1733 FERRIS AVENUE • LINCOLN PARK 25, MICHIGAN

January, 1945

MODERN MACHINE SHOP 351

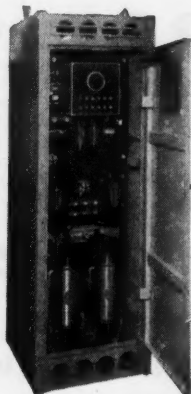
General Electric Type CR7503-B110 Seam Welding Control

A control designed exclusively for seam welding and incorporating a completely electronic timing circuit is announced by the Industrial Control Division of the General Electric Co., Schenectady, N. Y. Designated as the Type CR7503-B110, the control is said to be especially suitable for operations where frequent changes of the timing pattern are required, such as when welding a variety of materials of various shapes and thicknesses.

Operating on a 230/460/575-volt, single-phase, 60-cycle power supply, the control consists of a timing panel, firing and heat control panel, and power panel, any one of which can be separately disconnected and removed to facilitate inspection or servicing. An electronic circuit, incorporated in the control, is said to provide accuracy of the timing patterns of the weld without utilizing moving parts and regardless of normal, instantaneous, or gradual line-voltage variation. Smooth heat control is provided by the phase-shift method.

The complete control is mounted in a sturdy, floor-type enclosure, the full-

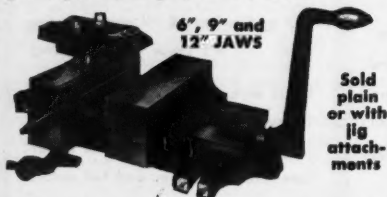
length front and rear doors of which can be locked. A calibrated heat-control dial is located on a compact panel which is readily accessible through a flap opening in the front door of the



General Electric Type CR7503-B110 Seam Welding Control

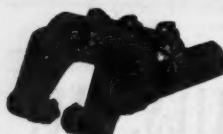
FOR MANY JOBS ON MANY MACHINES

With jig attachments, plus special V and shell jaws, this vise holds just about any shape work. Sizes up to 124 lb. for drill press, planer, shaper, miller, etc.



GRAHAM MULTI-PURPOSE VISE

KNURL HOLDER FITTING LATHE TURRET



With capacity up to 2 1/2" work dia., this 'Adjust-angle' Holder uses only straight knurls to cut spiral, straight and checkered patterns.

Request Illustrated Price Circulars

GRAHAM MFG. CO.

32 BRIDGE ST.

EAST GREENWICH, R. I.

enclosure. Snap switches for providing easy, instantaneous, and independent adjustment of the "heat" and "cool" time in one-cycle steps from 1 to 30 cycles are also located on this panel.

All tubes and connection terminals of the Type CR7503-B110 control are conveniently located. The water supply inlet and outlet fittings are situated on the outside of the enclosure, and a row of indicating lights on the front door shows instantly whether (1) the water flow is adequate, (2) power has been applied, and (3) the time delay has timed out.

Southwark Model SF-10 R Rotating Beam Fatigue Testing Machine

Designated as the Model SF-10 R, an oversize rotating beam fatigue testing machine has been produced by the Southwark Division of The Baldwin Locomotive Works, Passcell Station P. O., Philadelphia, Pennsylvania.

Designed to help "see around corners" in testing materials, the machine has a testing capacity of from 0 to 10,000

250% Increase in Piston Production with *Deepfreeze*

Industrial Chilling Machines

This job required the insertion of bronze bushings into cast iron and aluminum pistons. Three former methods, using locking screws and shrink-fit assembly, both with dry ice and liquid air, proved costly and unsatisfactory. To remedy these conditions two special Deepfreeze Industrial Chilling Machines are used in the following manner:

**Special -120°, 2000 B.T.U. Machines
Speed Shrink-Fit Assembly**

Bushings are immersed in the Deepfreeze machines at -120° F. for 3 hours. Then with the aid of an arbor press and a special cradle fixture for lining piston bore with arbor press spindle and also serving as a stop for the bushing to locate it in the piston, the parts are easily assembled.

The Deepfreeze Saves Labor and Production Costs

Results from employing the Deepfreeze shrink-fit method are excellent. Rate of assembly is increased over former methods from 200 to 700 parts in 20 hours; only one operator instead of two is re-

quired; actual operating costs are drastically reduced.

Learn How Cold Treating Can Be Applied to Your Production

Deepfreeze Engineering Service will be pleased to inform you how cold treating can be applied to your production. Your inquiry will not obligate you in any way

FREE . . . Complete Cold Treating Data

A comprehensive, up-to-date account of cold treating is contained in this new 40-page booklet. You can use this information to advantage. Send today for your copy of Bulletin No. I-4.



Only Motor Products can make a "Deepfreeze"

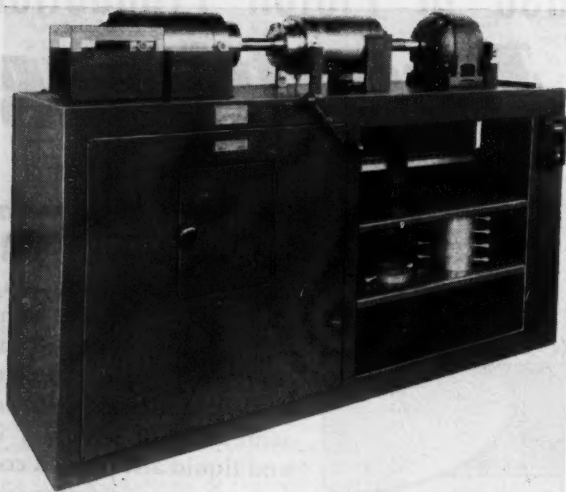
Deepfreeze

2318 DAVIS STREET,
NORTH CHICAGO, ILLINOIS

DIVISION OF
MOTOR PRODUCTS CORPORATION
DETROIT, MICHIGAN

TRADE MARK DEEPFREEZE REGISTERED UNITED STATES PATENT OFFICE

Industrial Chilling Equipment for Shrinking, Testing, Hardening and Stabilizing Metals



Southwark Model SF-10 R
Rotating Beam Fatigue Test-
ing Machine

inch-pounds, adjustable by units of five-inch-pounds (bending moment) by position of weight on beam. Specimen length is adjustable from $3\frac{1}{2}$ to 9 $\frac{1}{2}$ inches.

EutecRods 1800, 1601, and 16

Two silver-copper alloys and one copper alloy for use in tipping tungsten carbide and high speed steel tools are now available in fine powder form from Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y. Designated as EutecRods 1800, 1601, and 16, these alloys are said to be very economical to use since the required flux is mixed with the powdered alloy, thus eliminating waste of flux during preparation.

EutecRod 1800 is designed for use in tipping high speed tools at furnace temperatures from 940 to 1140 deg. F. EutecRod 1601 is recommended for use in tipping tungsten carbide tools at furnace temperatures from 1020 to 1250 deg. F., while EutecRod 16 is used in tipping tungsten carbide tools at furnace temperature from 1300 to 1750 deg. Fahrenheit.

To use, the powdered alloy, after the customary degreasing and grinding, is spread on the surfaces to be joined and the tungsten carbide tip is placed on top. The assembly is then heated until the alloy melts. The metal flows freely at a very slight increase in temperature above the melting point since the weld metal is pulverized. Oxidation of the tungsten carbide is said to be prevented as each particle of molten alloy immediately "tins" and adheres to the surfaces being joined.

Barco Combination Surface and Angle Plate

A specially designed 35 x 60-inch surface plate to one side of which is bolted and pinned a 24 x 32-inch plate, providing a combination surface and angle

HERCULES HOLDERS

Especially suited for parts numbering on steel, stainless steel and alloys, castings, brass, etc., these HERCULES Holders are available in both hand and press style, for one or two line convex or concave marking. No parts to loosen or wear out, type is instantly interchangeable by finger pressure on clip. Made of shock-resisting steel. Write for literature.



For simplified
gang-stamping
with faster
interchanging
of type

THE ACROMARK CO.

MORRELL STREET, ELIZABETH 4, NEW JERSEY

is de-
tipping
at fur-
s from
Eutec-
mended
g tung-
at fur-
s from
., while
used in
carbide
tempera-
to 1750

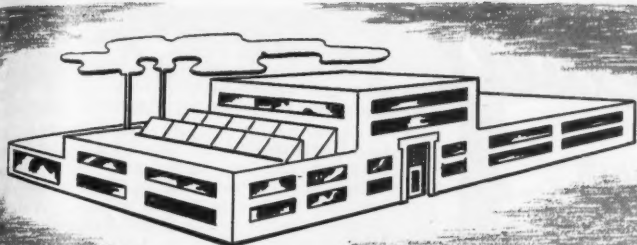
owered
custom-
grind-
on the
joined
placed
heated
flows
n tem-
t since
idation
to be
molten
eres to

and

h sur-
bolted
provid-
angle

plified
mping
ster
nging
ype

, 1945



WHEN YOU RECONVERT YOUR PLANT



Look
**TO
BROACHING**
for

LOWER COST

HIGHER SPEED

GREATER ACCURACY

BETTER FINISH

Let a Detroit Broach engineer give you
actual cost and production figures on
your own job.



DETROIT BROACH COMPANY

20201 SHERWOOD AVENUE
9308 SANTA MONICA BLVD.

DETROIT, MICHIGAN
BEVERLY HILLS, CALIFORNIA

Capewell

Skip Tooth

Band Saw Blades



For HIGH SPEED CUTTING
of Soft Non-Ferrous Metals
ALSO WOOD AND PLASTICS

- 1** Extra space between teeth removes material rapidly
- 2** Generate less heat

CAPEWELL

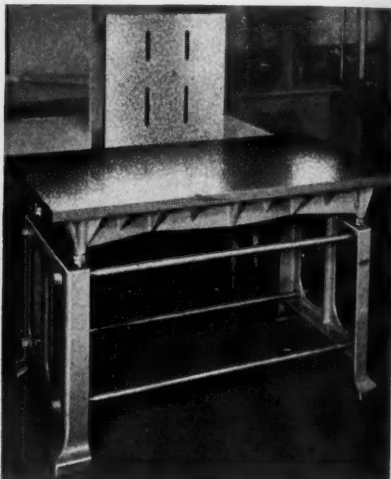
HACK SAW BLADES
 BAND SAW BLADES
 CONTOUR SAWS
 SKIP TOOTH BAND SAWS

THE CAPEWELL MFG. CO.
HARTFORD, 2, CONN.

plate, has been brought out by the Barco Scraping Co., 1976 E. 65th St., Cleveland 3, Ohio.

Both plates are made of Meehanite and are hand scraped to within 0.002 inch. The plates can also be furnished in machine or ground finish instead of hand scraped type. The smaller plate is scraped on top, face, and both sides, which are square with each other as well as with the larger plate. Weight of the smaller plate is 380 lb. while that of the larger plate is 1,650 pounds.

For mounting the Barco Combination Surface and Angle Plate, a special table



Barco Combination Surface and Angle Plate

made of Meehanite and weighing 325 lb. is provided. Available in one standard size only, the combination plate can be supplied in special sizes on order.

J & S "Form-Checker"

Designed to provide a quick, easy, and efficient means for checking grinding wheel form, the "Form-Checker" now being offered by the J & S Tool Co., 477 Main St., East Orange, N. J., comprises a tough, non-burring plastic material which is said to take a clear, sharp outline without wearing down the wheel form. Convenient to use, the Form-Checker is supplied in packages of fifty pieces.



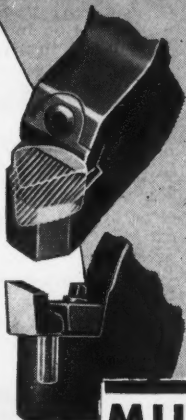
INSERTED-BLADE METAL CUTTING

TOOL SYSTEM

Single Point Tools

**FOR LATHES
PLANERS
SHAPERS, Etc.**

These tools embody various locking designs. In some, the bits are held in mated serrations; in others, round-shank bits are locked in a drop seat. In others, the locks are different still. The bodies, or holders, are made of drop-forged alloy steel and the bits may be had in high speed steel or tungsten carbide tipped.

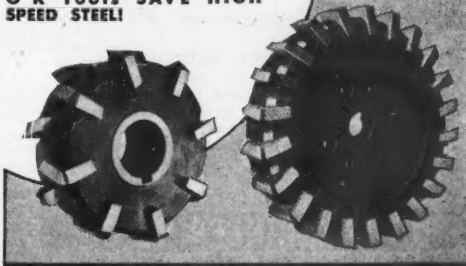
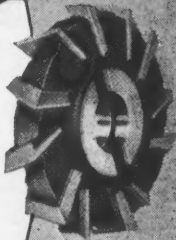
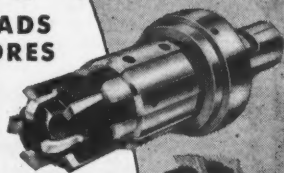


For extra speed and economy, replace old-style solid milling cutters and lathe, planer and shaper tools, with these modern designs. There is an O K Tool for every metal-cutting need, with a wide assortment of standard bits and blades, and innumerable special shapes to order.

MILLING CUTTERS

**BORING HEADS
COUNTERBORES
FACE MILLS
END MILLS
REAMERS**

As in the Single Point Tools, the blades of O K Milling Cutters are separate cutting units, the bodies are drop-forged alloy steel. The blades are driven into serrated mating slots. There they lock automatically and positively without pins, wedges or set-screws; yet they are instantly adjustable in line of wear. All O K Tools SAVE HIGH SPEED STEEL!



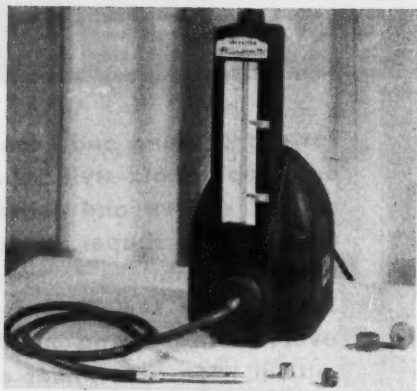
**FREE—New Booklet
Showing How To
Grind Milling Cutters**

This useful booklet is a complete treatise on the grinding of milling cutters. Simply told, profusely illustrated. Send for it now.

**THE OK TOOL CO.,
SHELTON, CONN.**

January, 1945

MODERN MACHINE SHOP 357

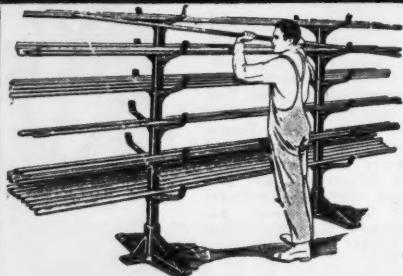


Sheffield High Amplification Precisionaire

Sheffield High Amplification Precisionaire

An unusually high amplification Precisionaire especially designed for use in the rapid checking of critical internal dimensions having a tolerance of plus or minus five millionths (0.000005) of an

SAVES TIME IN YOUR STOCK ROOM



The BROWN SECTIONAL RACK saves the time wasted end-hauling stock from the old-style, closed-side rack and quickens the selection of sizes by greater visibility. Built of standard metal sections: can be expanded for changes in stock or growth of business. Made in 5 styles: can't burn, depreciation practically nil.

SEND FOR BULLETIN 26-M.

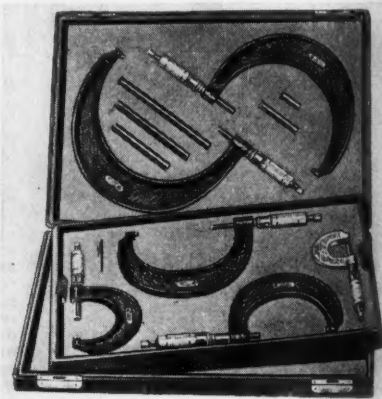
BROWN ENGINEERING CO.
120 N. THIRD ST. READING, PA.

inch has been developed by The Sheffield Corp., Dayton 1, Ohio.

Of the same general appearance as previous models but modified with specially built high precision metering components, the new Precisionaire provides an amplification of 20,000 to 25,000 to 1 (a spread of 2 to 2½ inches per 0.0001 inch) on internal measuring and is graduated in five millionths of an inch increments. Master gaging rings and spindles are made to an unusual degree of accuracy.

Central Certified Accuracy Micrometers

A micrometer with crescent shaped frame drop forged from special alloy steel and having a permanent non-corrosive baked enamel finish has been



Central Certified Accuracy Micrometers

added to the line of Certified Accuracy micrometers marketed by the Central Tool Co., Auburn, Rhode Island.

Available in sizes from 1 to 6 inches individually or in sets, the micrometer also features a thimble whereby adjustment can be made adaptable to the individual touch. The spindle is made from a single piece of tool steel and is hardened to eliminate excessive wear. Provisions to permit adjustment for wear of the screw and measuring surfaces are also incorporated in the design of the micrometer.



GET IT!

THE Clark ADJUSTABLE TOOL HOLDER

with all these features:

1. Exclusive vise-grip jaw exerts 4-sided pressure evenly over *full* length of cutter channel, prevents sagging under-channels and broken bits.
2. Bearing surface of the adjustable vise-grip jaw has twice the width and five times the length of the average tool holder, and takes 4 or more sizes of tool bits.
3. Vise-grip jaw clamps large heavy bits or short stub ends with the same rigidity as forged tools.
4. Dual and narrow tool bits are firmly held for cutting-off or special forming operations.
5. Vise-grip securely holds and supports carbide bits, threading tools and boring bars. Protruding underlip prevents breakage.
6. Tilted position of head gives operator unobstructed view of cutting edge.



SPECIFICATIONS

MODEL	SIZE	CAPACITY
60	0	1/8 to 5/16
61	1	3/16 to 3/8
62	2	1/4 to 1/2
64	4	5/16 to 5/8

With 15° or parallel cutter channel either left or right hand.

For complete information, call your Clark Cutter Jobber today, or write for catalog **MMS-1TH**.

Tool Holder P62R gripping
Clark Lever-Lock Boring Bar



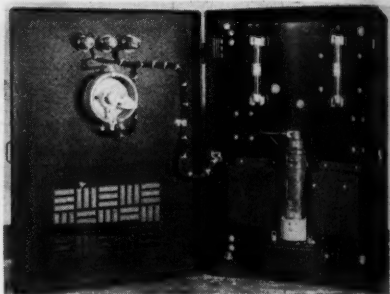
ADJUSTABLE CUTTING TOOLS FOR ALL MATERIALS

Improved forged steel polished frame micrometers with decimal equivalents on the frames are available in 1 and 2-inch sizes. Round anvil micrometers for use in measuring the wall thickness of tubing can be furnished in 1-inch sizes with either enamel or polished frames. In addition, the company now has available micrometers with ratchet stops, lock nuts, and 0.0001-inch graduations, as well as a full range of metric micrometers.

Westinghouse Type SP-18 Welding Timer and Heat Control

Suitable for welding small objects of high conductivity such as aluminum or copper, a precise welding timer with heat control for timing intervals of one half cycle or less is announced by Westinghouse Electric & Mfg. Co., Dept. 7-N-20, East Pittsburgh, Pennsylvania.

Rated at 230/460 volts, 50/60 cycles, the timer, which is designated as the Type SP-18, is so designed that welding current is said to be started at the same point on the voltage wave for every operation. According to the manufacturer, the timer is particularly



Westinghouse Type SP-18 Welding Timer and Heat Control

useful for welding such items as radio tube parts and socket, pig-tail resistors to terminal lugs, watch and instrument parts, contact tips on electrical relays, and other small parts.

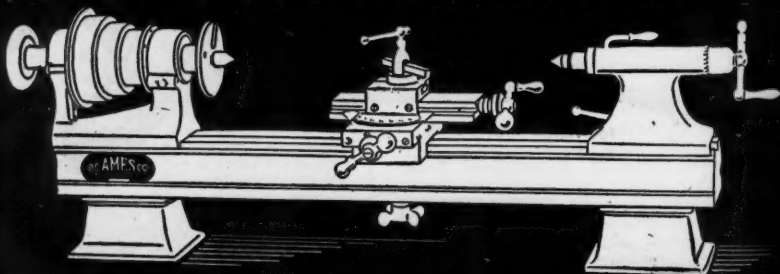
The Type SP-18 timer is furnished as separate control for use with existing small bench welders and also in combination with a small welding transformer. Only one control tube is used, this Thyatron serving the dual purpose of rectifying alternating current

AMES *Precision* BENCH LATHE

Known for 40 years as a precision lathe of the highest quality. Bed 36" long. Ball bearing headstock uses 1" capacity collets. Swing $8\frac{3}{8}$ " over bed. Available with motor drive.

Send For Catalog

B. C. AMES CO., WALTHAM, MASS., U.S.A.





• On nine Societe Genevoise Boring Mills, Allied's craftsmen maintain a single standard of excellence.

Buy More War Bonds

A Single Standard of Excellence

Your postwar products deserve the same thoroughgoing craftsmanship and unerring precision that Allied is building into products for war.

Even before the first World War, the divisions of Allied were famous for their inflexible single standard of excellence and meticulous workmanship. Over the years, R-B interchangeable punches, Allied sheet metal dies, steam-heated plastic molds, special tools and cold forged parts have found their way into nearly every mass production industry. In this war Allied has produced countless

thousands of hardened and precision ground parts; many for airplane engines machined to within limits of two ten-thousandths of an inch.

Soon Allied's enlarged and improved facilities will be turned to production for peace. If you are looking for a dependable, economical source of supply you can use Allied's "Pool of Precision". Write today. . . .

"IT'S AN ALLIED PRODUCT" . . . Allied Products Corporation and its divisions, Richard Brothers and Victor-Peninsular, in Detroit and Hillsdale, Michigan, also make: Jigs and fixtures, cold forged parts, cap screws, other special products.

Department 17
4624 Lawton Avenue
Detroit 8, Michigan

ALLIED PRODUCTS CORPORATION

January, 1945

MODERN MACHINE SHOP 361

to charge a firing capacitor and also firing the small ignitron power tube. Heat control is accomplished by the phase shift method, the adjustment dial for which is mounted on the cabinet door.

Rieger Die Holder

Built to accommodate either a 1 or 1½-inch O. D. button die, the Rieger Die Holder illustrated herewith is now being produced by The Rieger Mfg. Co., Dept. MMS-8, Miamisburg, Ohio. The



Rieger Die Holder

holder is standardly available with a No. 2 Morse taper shank. It can also be obtained with other taper or straight shanks on special order. Four large holes in the body of the holder provide for the free ejection of chips and shavings.

Designed for use in bench lathes, turret lathes, or drill presses having reversible spindle rotation, the Rieger Die

Holder is recommended for the production chasing of threaded sections up to ⅝ inch in diameter and 3 inches long. Made of tough alloy steel, which is heat treated and ground to a high finish, the holder is constructed to assure the production of straight threads and to withstand severe usage.

Standard Tachometer

Constructed to permit one-hand manipulation, a tachometer 2½ inches in diameter and weighing 5½ ounces has been placed on the market by the Standard Machinery Co., Providence, R. I. The instrument has a range of from 500 to 3,600 r.p.m., recordings being constant and quickly read without the use of timing or counting devices. The scale consists of black figures against an orange background.

The design of the Standard Tachometer also includes a pointed contact spindle to allow for use of the instrument with shafts that are centered. Where it is desired to use the tachometer with shafts that are not centered, an elastic tip, furnished as standard with the instrument, can be slipped over the pointed spindle.

The Standard Tachometer is dust and



Standard Tachometer



5 GOOD REASONS FOR famco FOOT PRESS POPULARITY

Famco Foot Presses are the inexpensive solution to light forming, stamping and punching jobs. Made in 10 models, easily operated by women or girls, they offer mass production speed without power cost. Let Famco help select the proper machine.

Write for catalog.

FAMCO MACHINE CO.

1324 18th St., Racine, Wis.

- ✓ LOW FIRST COST
- ✓ SIMPLE TO "SET UP"
- ✓ LOW UPKEEP COST
- ✓ EASY TO OPERATE
- ✓ SMALL FLOOR SPACE

For more Speed in the "Tight Spots"



Photo courtesy Republic Aviation Corporation

—USE FLEXIBLE, VERSATILE SNAP-ON "COMBINATIONS"

Remember back when "tight spots" were roundly damned as "bad design". Today they are the accepted penalty of good design . . . the unavoidable result of packing incredibly high performance into sharply restricted dimensions.

And for the toughest tight spots there are modern Snap-on tools . . . versatile "combinations" that reach into deepest pockets, grip hidden nuts securely, turn them easily, swiftly, solidly. The instant adaptability of Snap-on sockets, handles and ratchets, multiply the range of a compact Snap-on kit into hundreds of

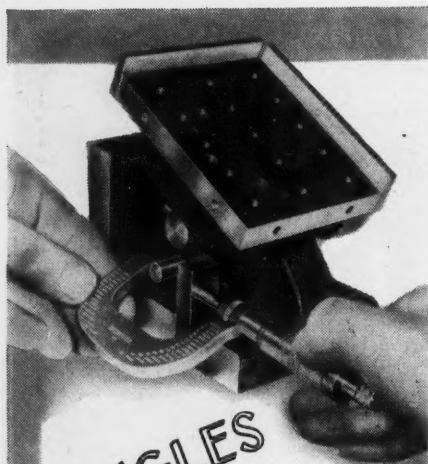
speed tools for specialized applications. And frequently save the cost of specially designed one-job tools!

Snap-on nation-wide service, with 38 factory branches in key production centers, provides right-at-hand personal tool service to industry everywhere. Write for Snap-on catalog and address of nearest branch.

SNAP-ON TOOLS CORPORATION

8032-A 28th Ave. Kenosha, Wisconsin





ANGLES

"TO A MINUTE IN A MINUTE!" THE BEMISINE

SPEEDS UP AND SIMPLIFIES
SETTING ANY ANGLE FROM
0 TO 90° — USING ONLY A
2" MICROMETER! *IT HOLDS
THE WORK! FASTER THAN A
SINE BAR OR PROTRACTOR!
CONVERTS SET-UP TIME TO
PRODUCTION TIME ON SUR-
FACE GRINDERS, JIG BORERS
AND MILLERS.

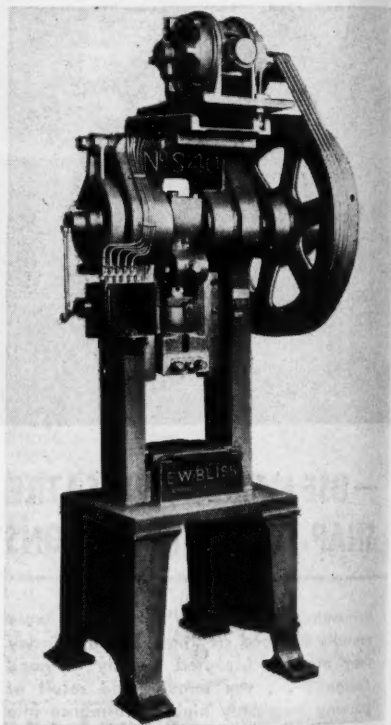
**Also Used With
Standard Gage Blocks*



moisture-proof and includes a baked enamel protective coating on all surfaces except the scale, which is enclosed in a plastic tube.

Bliss No. S-40 Mechanical Power Press

Especially designed to meet the requirements of the lock manufacturing industry, a mechanical power press



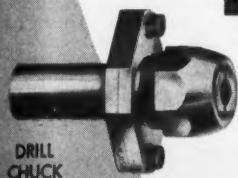
Bliss No. S-40 Mechanical Power Press

designated as the No. S-40 has been built by the E. W. Bliss Co., 53rd St. & Second Ave., Brooklyn 32, N. Y. The press features a compact solid frame which is ruggedly constructed to withstand load speed beyond the rated capacity of the machine. The die space and operating area are concentrated for specialty dies.

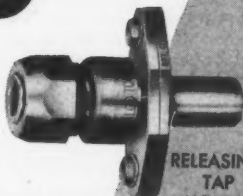
A Parade of Champions

ALCO

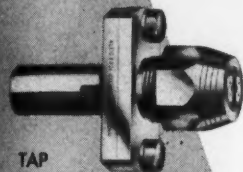
Here is the complete line of
Alco Tools for Screw Machines.
Designed for Efficiency, High
Speed and Economy.



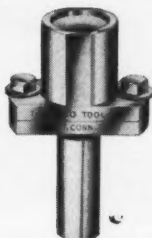
DRILL
CHUCK



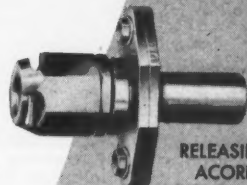
RELEASING
TAP
HOLDER



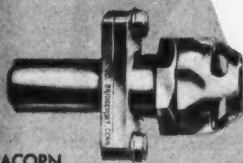
TAP
HOLDER



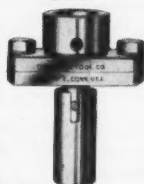
ROLLER
STOP



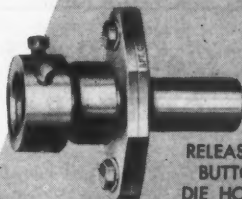
RELEASING
ACORN
DIE HOLDER



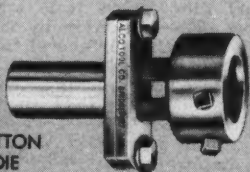
ACORN
DIE
HOLDER



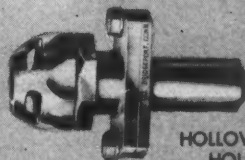
SPRING
DIE
HOLDER



RELEASING
BUTTON
DIE HOLDER



BUTTON
DIE
HOLDER



HOLLOW MILL
HOLDER

ALCO EFFICIENT TOOLS

THE ALCO TOOL CO. 152 BIRDSEY ST.
BRIDGEPORT, CONN.

Detroit: 908 Stephenson Bldg., MADison 5870. Chicago: 6219 S. Kenwood Ave., Hyde Park 6807

Designed to occupy a minimum of floor space, the No. S-40 press is equipped with a semi-automatic lubricating system to essential bearings. The operating speed of the unit is approximately 125 strokes per minute; however, a considerably higher operating speed can be obtained by attaching single or double roll feeds to the press. The machine can be arranged with a front-to-back or back-to-front feed.

Specifications of the Bliss No. S-40 Mechanical Power Press are as follows: rated capacity at bottom of strokes, 40 tons; bed area front to back by right to left, 14 x 14 inches; stroke, 3 inches; die space, 10 inches.

Selas "Liqui-jector"

Designed for use in connection with air guns, sprays, and brushes in applying industrial finishes, a device which is constructed to automatically and continuously remove condensate (droplets, slugs, or mist) from compressed air and gas lines, to be known as the "Liqui-jector," is announced by Selas Corporation of America, Erie Ave. and D. St., Philadelphia 34, Pa. Adapt-

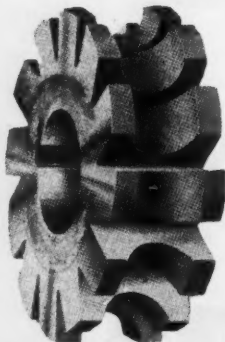
able to air and gas lines up to 1½-inch pipe size and normal line pressures. The device includes no moving parts and requires no cocks, traps, or shutoffs in the drain line (which is open to the atmosphere). Action is entirely automatic and continuous through two porous tubes—one inherently water-repellent, the other water-permeable but air-impervious.

Basis of the product is a recently discovered method for automatically separating liquid and gas phases by vir-



Selas "Liqui-jector"

Form Relief CUTTERS



Made
Promptly
To Print

SEND US
YOUR
PRINTS FOR
PROMPT
QUOTES

Veet
MFG. CO DETROIT

TOOL
DIVISION
17601 Lorain
Avenue
CLEVELAND
OHIO

tue of the surface tension of the liquid. Compressed air entering the Liqui-jector passes through the first (and water-repellent) tube where it is stripped of moisture. The action is by coalescence of droplets on the surface of this tube—a coarse ceramic material with an average of 50,000 pore openings per square inch, each so small that the pressure drop across the tube is insufficient to permit water passage against the resisting diaphragm-action of its surface tension. The coalesced moisture drops to the bottom of the unit where it passes through the second tube (without loss of air) to outside atmosphere. This second tube is constructed of micro-porous porcelain, with an average of 720 million pore openings per square inch, and, being constantly wet by its wick action, is said to constitute a perfect air seal up to the rated limit working pressure of the unit. This



THE PROOF IS IN THE PRODUCTION

- More pieces between grinds
- More grinds per tool
- Less down time
- Lower tool cost

More production! Lower costs! Reports are the same whenever plants use TECO Cemented Carbide. The surest way to learn what TECO Cemented Carbide tools can do for **you**, is to run them under your own conditions.

MAKE THIS SIMPLE CHANGE! Just use TECO Cemented Carbide in place of present carbide tools on any turning, boring or facing job. Then compare results with former production.

TECO Cemented Carbide stays on the job longer because it is harder, denser, more uniform—thus has greater resistance to wear and breakage. Outline your operation for recommendation—or have a tool engineer discuss your needs, without obligation. Catalog and price list on request.

IMMEDIATE DELIVERY FROM STOCK can be made on most standard TECO Cemented Carbide Tools and Blanks.



TUNGSTEN ELECTRIC CORPORATION 562 39th Street, Union City, N. J.

Branch Office: 2906 Euclid Avenue, Cleveland, Ohio

Representatives: Indianapolis, Ind. Chicago, Ill. Detroit, Mich.



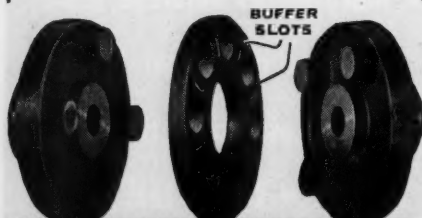
Pioneers in Tungsten Carbides
for over a Quarter Century



TECO CEMENTED CARBIDE

LOOK---

WHAT CUSHION TORQUE WILL DO FOR YOU



BUFFER-SLOT COUPLING

It lengthens the life of your Motor-Driven machines by reducing wear and absorbing the load-shock and vibration that are the sources of most machine failures. It gives you all the advantages of the ordinary coupling and in addition restores to your Direct Drives the protective resiliency you lost when you discarded the Belt Drive. It is a long-lived, dependable device especially valuable for use with Ball or Babbitt Bearings. SEND FOR BULLETIN No. 24-M.

BROWN ENGINEERING CO.

120 N. THIRD ST. - READING, PA.

rated pressure may be adjusted to user specification.

The Model A-151-1 Liqui-jector shown in the accompanying illustration is designed to accommodate lines up to $\frac{3}{4}$ -inch pipe size with line pressures up to 100 p.s.i. The oval shape of the unit allows for flush-against-the-wall installation—directly in the line—without the addition of elbows or other fixtures. Units to meet the greater demands of the larger lines are also being made available.

Nobur Angle Bracket for Drill Press

An angle bracket which, when installed on a drill press, adapts the machine to angle drilling, polishing,



Nobur Angle Bracket in Use

buffing, sanding, rotary filing, wire brushing, tapping, reaming, burring, grinding, honing, and other operations is announced by the Nobur Manufacturing Co., 908 N. Orange Drive, Los Angeles 38, Calif. With the bracket, the spindle of the drill press can be adjusted to any desired height, located horizontally or vertically, and set at any angle.

The Nobur Angle Bracket is available in sizes for installation on drill presses with $2\frac{1}{4}$ to 3 $\frac{29}{32}$ -inch tubular columns. The bracket is rigidly constructed and can be positively locked in any desired position by means of a single turn of a wrench.

user

known
s de-
o 1/2-
s up
the
all in-
thout
tures.
ds of
made

Press
on in-
s the
shing.

, wire
burring,
erations
ufactur-
Los An-
ket, the
be ad-
located
set at

available
presses
lar col-
struct-
d in any
a single

January, 1945



VASCOLOY-RAMET

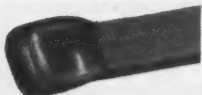
Tantalum-Tungsten

STANDARD CARBIDE TOOLS AND BLANKS

WORLD'S FINEST CARBIDE

Will perform 90% of all Carbide tool operations. Get maximum machining efficiency in minimum cutting time. Write today for Price List VR-330 showing additional new standards and revised prices.

Tools Protected By
**PLASTIC
JACKET!**



Protects cutting edge if tools are dropped in transit or toolrooms. Removable. Does not leave residue. Replace after tool inspection. Resilient, tough, oil-proof, moisture-proof. Supplied free.

VASCOLOY-RAMET CORPORATION

NORTH CHICAGO • ILLINOIS
SALES & SERVICE IN PRINCIPAL CITIES

4502

January, 1945

MODERN MACHINE SHOP 369



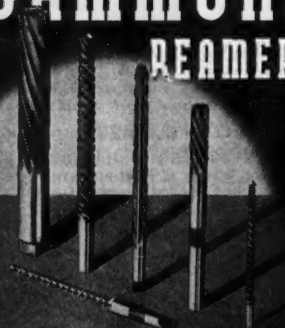
"Super" Twist Drill Sharpening Fixture

"Super" Twist Drill Sharpening Fixture

The accompanying illustration shows a simple fixture for the easy and accurate sharpening of twist drills in a minimum of time which is now being offered by A. D. McBurney, 939 W. Sixth St., Los Angeles 14, California.

GAMMONS

REAMERS



Manufacturers of

The Gammons Helical Taper Pin Reamer
 The Gammons Helical Chasing Reamer
 The Gammons Helical Oil Machine Reamer
 The Gammons Duplex Taper Pin Reamer

*Special reaming problems invite
 send for Catalog*

THE GAMMONS-HOAGLUND CO.

MANCHESTER
CONNECTICUT

Known as the "Super," the fixture is designed to handle drills from 3/32 to 1 1/16 inches in diameter and up to 11 inches in length. It is adjustable to either 59, 69, or 88-deg. angle.

Warren Precision Gages

In addition to special cutting tools, Warren Industries, 26667 Mound Rd., Warren, Mich., is now manufacturing a line of precision gages, including flush pin, precision built-up fixtures, indicator, taper plug, and taper ring gages. The company is also manufacturing special grinding equipment.

Books

The Extrusion of Metals.—By Claude E. Pearson. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 205 pages. Cloth binding, board covers. Price, \$3.75.

As the result of a need for authentic information on the process of extrusion the present work has been written. The author has endeavored to collate the scattered information existing on the subject and to present from it a concise account of extrusion practice relating to different classes of work and materials.

The historical development of the process has been shortly indicated. An attempt has been made to avoid offering a mere description of plant and procedure by introducing theoretical aspects where possible. With this object, chapters have been included to deal with flow phenomena in the process and with factors, such as temperature, the speed and extent of deformation, and so on, in their influence on the extrusion of metals. In regard to this, the author has drawn, besides his own experiments, upon the important investigations carried out in Germany.

The subject of impact extrusion tends to fall into a class by itself and has received separate treatment. Some space has also been given to those specialized methods of extrusion which form a connecting link between it and forging.

The complete list of chapter headings in the book is as follows: Historical Survey; The Extrusion of Lead and Other Soft Metals; The Extrusion of Lead Cable-Sheating; Equipment for the Hot Extrusion of Hard Metals; Flow in

At Last

a standard marking system
for grinding wheels

Quick, easy, understandable information on everything anyone needs for specifying, buying and using grinding wheels features this new Standard Marking System. Devised and adopted by the Grinding Wheel Manufacturers Association, it will be Standard for all manufacturers.

For the convenience of customers, until the new uniform system becomes universal, Abrasive Company wheels will bear two markings—one according to the old system, one according to the new.

Users are cautioned that while wheels of different makers may be marked alike, they will not necessarily grind alike. In selecting wheels, therefore, it is always advisable to consult the Abrasive Company's Grinding Wheel Data Book Supplement which lists General Recommendations, using the New Marking System, for a wide range of materials and jobs.



The Abrasive Co. Trade-Mark on any Grinding Wheel assures accuracy to specifications indicated by the Marking.



DISTRIBUTORS IN ALL PRINCIPAL CITIES



1 Folder describes and illustrates the New Standard Marking System and shows how it differs from former system. Should be in the hands of all buyers and users.



2 Handy simple chart for desk or wall for ready reference to the New Standard Marking System. Get one for everyone in your plant who is concerned with Grinding Wheels.



3 120 page GRINDING WHEEL DATA BOOK is an authentic manual. Descriptive data on the use and application of Abrasive Company Products.



4 Supplement to the GRINDING WHEEL DATA BOOK lists general grain and grade recommendations for 177 grinding classifications according to New Standard Marking System.

CLIP COUPON AND MAIL

ABRASIVE COMPANY, Philadelphia 37, Pa.

Division of Simonds Saw and Steel Company

Please send Guides to New Marking System as follows: No. 1 ☐ No. 2 ☐ No. 3 ☐ No. 4 ☐

NAME _____

ADDRESS _____

January, 1945

MODERN MACHINE SHOP 371

Victor
HAND HACK SAW
BLADES

VICTOR HIGH
VICTOR

1 For faster cutting of hard, soft metals and others materials.

2 Sharp hardened tooth-edge cuts clean and deep; accurate set eliminates clogging and leaves cut surface smooth; finest high speed steel, scientifically heat-treated, gives a more durable long lasting hack saw blade.

3 Booklet, "Metal Cutting" gives helpful hints on care and use of hack saw blades and other VICTOR products. Send for a copy today. Victor Saw Works, Inc., Middletown, N. Y.

METAL CUTTING
Victor

VICTOR

Makers of hand and power hacksaw blades, frames and metal cutting band saw blades.

Metals during Extrusion; The Pressure of Extrusion; Metals and Alloys for Hot Extrusion; The Properties of Extruded Metals; The Impact Methods of Extrusion; Some Special Applications of Extrusion.

Wage Incentives. By J. K. Loudon. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 174 pages. Cloth binding, board covers. Price, \$2.50

In this book, an effort has been made to plead the cause of incentives by attempting to tell their story in a balanced manner. In doing so the author has written primarily for the man of management and the man of labor rather than for the engineer since it is his desire to tell these two groups as briefly and concisely as possible what incentives really are and what they can really do. In the understanding which management and labor have of their use and in their balanced perspective the success or failure of incentive lies.

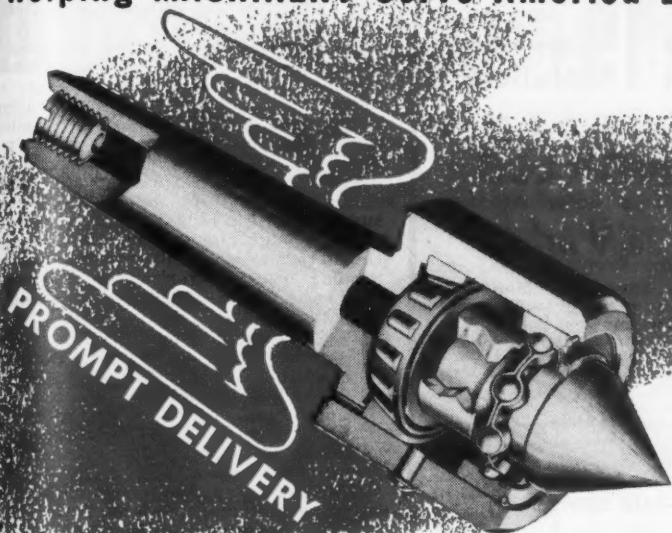
An endeavor has been made to avoid excessive details without sacrificing clearness and understandability. Rather than review the many ramifications of various incentive plans and their uses, the author has chosen to hew a straight line, emphasizing policies, relationships, controls, and the like which it is believed have been less understood and appreciated than the technical details of the various wage incentive plans.

Included in the book are 12 chapters which are headed as follows: A Brief History of Wage Incentives; Relationships of Wage Incentives to Other Phases and Functions of Management; Five Fundamental Types of Wage Incentive Plans; Eleven Basic Requirements of a Sound Incentive Plan; Comparison of Incentive Plans; Policies Governing Wage Incentive Payments to Insure Their Fair and Equitable Administration; Wage Administration; Cost Control Reports; Supervisory or Keyman Incentives; The Control of Quality in Incentive Installations; Typical Incentive Installations; Union Participation.

Seamless Steel Tube Data Book. Published by Seamless Steel Tube Institute, Gulf Bldg., Pittsburgh 19, Pa. 330 pages, 8½ x 11 inches. Loose-leaf binder. Price, \$2.50.

Included in this book are four principal sections on seamless steel tubing;

Helping MACHINERY Serve America Better!



OVER 100 PRODUCTS TO HELP MACHINERY SERVE BETTER

NEW IDEAL "Universal" CHUCK

- Fits easily on any lathe (5")
- 3 Jaws hardened and ground, 2 sets — Internal and External Work
- Cast adapter with each chuck
- 3 Pinions for faster chucking
- LOW COST—High Precision



Other IDEAL Machine Tool Products Include: 4-Jaw "Independent" Chuck (6"), Demagnetizers, Metal Etchers, Grinding Wheel Dressers, Balancing Ways, Dust Collectors, Electric Cleaners.

**Write for FREE IDEAL
Machine Tool Catalog.**

IDEAL Live Center Speeds Production

America's machine tool users know from war-time experience how IDEAL Live Centers have helped speed production by making it possible to turn heavier loads, take deeper cuts, at higher speeds.

For post-war production, IDEAL Live Centers offer the same additional advantages of accurate turning (due to special bearing construction), elimination of dead-center-friction, and set-up economy.

4 Interchangeable Inserts for all kinds of centered and uncentered work.

IDEAL Sycamore

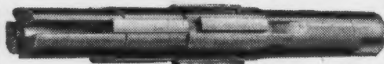
IDEAL COMMUTATOR DRESSER COMPANY
1031 Park Avenue • Sycamore, Illinois
In Canada, Irving Smith, Ltd., Montreal, Quebec.

19

A Set of **Nicholson**

E-X-P-A-N-D-I-N-G MANDRELS 209 does the work of Solid Arbors

NICHOLSON EXPANDING MANDRELS handle all bores from $\frac{1}{2}$ " to 7", representing remarkable savings in money, as well as in man and machine hours. Hardened tool steel, accurately ground. Two types, all sizes; sold singly or in sets. Prompt delivery. Bulletin 1043.



TYPE A—STEP JAW DESIGN

Especially adapted for holding work with short bores while being machined between centers on lathes, grinders, millers, shapers, etc.

Size No.	Range of Bores Taken	Length Overall
1A	$\frac{1}{2}$ " to 1"	9"
2A	1" to $1\frac{1}{2}$ "	11"
3A	$1\frac{1}{2}$ " to 2"	$12\frac{1}{4}$ "
4A	2" to 3"	$20\frac{1}{2}$ "
5A	3" to 4"	21"



TYPE B—STRAIGHT JAW DESIGN

Adapted for work with both short and long bores.

Size No.	Range of Bores Taken	Length Overall
1X	$\frac{1}{2}$ " to $\frac{5}{8}$ "	5"
2X	$\frac{5}{8}$ " to $21/32$ "	6"
3X	$21/32$ " to $3/4$ "	6"
00	$3/4$ " to $7/8$ "	$8\frac{1}{4}$ "
0	$7/8$ " to 1"	$8\frac{1}{4}$ "
1	1" to $1\frac{1}{4}$ "	9"
2	$1\frac{1}{4}$ " to $1\frac{3}{8}$ "	$11\frac{1}{4}$ "
3	$1\frac{3}{8}$ " to 2"	$13\frac{3}{4}$ "
4	2" to $2\frac{1}{2}$ "	$17\frac{1}{4}$ "

(Other sizes taking up to 7" bores.)

W. H. NICHOLSON & CO.
136 Oregon St., Wilkes-Barre, Pa.

Namely, General Data; Mechanical Tubing; Pressure Tubing; and Reference Tables.

The General Data section comprises a brief summary on the history and manufacture of seamless steel tubing; information on tube testing, various shapes and forms of tubing, standard steels with chemical compositions, mill practices, and so on.

The section of Mechanical Tubing includes information on typical uses; suggestions on how to obtain best results through the use of tubing and on the determining of proper size tubing; tabular data on tolerances; properties of beams; and a digest of standard specifications.

The section devoted to Pressure Tubing covers various pressure formulas, specifications, and tolerance tables for boiler tubes, heat exchanger and condenser tubing, still tubes, and alloy steel pipe. It also contains information on stainless steel analysis, together with metallurgical data.

The Reference Table section features many formulas, weight tables for rounds, squares, rectangles, surface areas (both inside and out), and other tables commonly found useful in tubing applications.

Supplementary sheets with new data will be supplied from time to time to individuals obtaining copies of the Seamless Tube Data Book.

Manual of Machine Shop Practice. By Otis Benedict, Jr. Published by McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18, N. Y. 240 pages. Cloth binding, semi-flexible covers. Price, \$1.75.

An outgrowth of notes prepared by the author, this text is not a book on machine-tool operation but rather a presentation of material that is helpful to the student pursuing a course in engineering shop practice. The book includes 11 chapters covering such subjects as Chisels and Files; Cutting Speeds; Time for Machining; Screw Threads; Tapers; The Spiral Head; Tolerances and Allowances for Machine Parts; The Use of Common Precision Measuring Devices; Press Tools; Typical Standard Die Sets; and Machine Tool Analysis.

Also included is a group of 10 experiments on Hand Tools and Their Use; The Lathe; Drilling Machines; The Milling Machine; The Shaper; The Planer; Small Tools and Precision

Improved Tapping Head



- Better Design Lines
- Increased Output
- More Accurate Work
- Less Tap Breakage

The Tru-Grip Tap Holder, for instance, weighs one-third as much as conventional chucks, which kills fly wheel effect and promotes more accurate tapping. The tap holders have small outside diameter: $\frac{3}{4}$ " for No. 1, 1" for No. 2, 1 $\frac{1}{4}$ " for No. 3—which permits use of tapping head in hard-to-get-at spots. Shank is one piece, heat treated and precision ground.

Tap is driven by square and held true by the round. Many other features include: Dry, double-cone friction clutch that won't wear and can't absorb oil; makes bottom tapping easy; ball bearings; three point balanced, heat-treated gear reversing mechanism which distributes pull and greatly reduces strain.

External Threading

Standard Proconier Tapping Heads can be equipped for external threading. Produce accurate work and increase output.

Cross section of Tru-Grip Tap Holder showing positive drive to tap.

Send for Bulletin

giving full details, description and prices on complete line of Proconier Precision Tapping Heads to meet all needs. The new Tru-Grip Tap Holder—and also the full line of Proconier Universal Tapping Machines.

PROCUNIER
SAFETY CHUCK CO.

12 S. Clinton St.
CHICAGO 3, ILL.

PROCUNIER SAFETY CHUCK CO.,
12 S. Clinton St., Chicago 3, Ill.

Send me bulletins on: ☐ High Speed Tapping Heads ☐ Tru-Grip Tap Holders ☐ Universal Tapping Machines.

Name

Address

Measuring Instruments; The Spiral Head; Gages and Gaging; and Precision Methods of Locating Holes. In addition, the book contains an appendix featuring tables on cutting speeds and decimal equivalents.

"Federal Agencies" is the title of a booklet published by the Citizens National Committee, Inc., 1409 L St., N. W., Washington 5, D. C. This descriptive tabulation of 428 functional units of the Federal government is designed to provide interested citizens with sufficient accurate information to launch them into consideration of what Government should do and how it should operate after V-day. To that end, it provides the name, a description of the function, the method and year of creation, and the appropriation and estimated average personnel for each of the agencies listed as of June 30, 1944.

In addition, agencies are listed to show "parentage"—who works for or under whom. And the "children" are listed whether they receive direct appropriations or operate with the funds or personnel of other agencies. In most cases, the exact source of the agency's authority, is given, whether statute, executive order, or some other method of creation. To complete the booklet's usability, an elaborate cross-indexing of all listings is provided, giving official names and a list by the key word in each name as well.

Copy of "Federal Agencies" is available at a price of 25 cents.

"The Annealing of Steel" is the subject of a 59-page book published by the Crucible Steel Company of America, 405 Lexington Ave., New York 17, N. Y.

Written by Peter Payson, Chief Research Metallurgist, Eastern Research Laboratory, Crucible Steel Company of America, the book is divided into six chapters which are headed as follows: Statement of Principles; Construction of Transformation - Temperature - Time Curves; Correlation Between Transformation During Continuous Cooling and Transformation at Constant Temperatures; Annealing Cycles Based on TTT Curves; Miscellaneous Factors which Control Microstructures of Annealed Steels; and Summary. Illustrations; tables, and references are included with several chapters.

Copy of "The Annealing of Steel" is available at a price of \$1.00.

How to Cut Waste. By Glenn Gardiner. Published by Elliott Service Co., 219 E. 44th St., New York 17, N. Y. 33 pages. Cardboard covers. Price, 35 cents.

Especially designed for foremen, department heads, and supervisors, this booklet covers the subject of waste in a very interesting and thorough manner. Contents are divided into two parts.

Part One, "Spotting the Causes of Waste," deals with the following topics: The Waste of Manpower; Waste of Materials and Supplies; How Machinery and Equipment Are Wasted; Waste of Work Space; How Wasteful Accidents Are Caused; Causes of Time Waste; Waste Resulting from Non-Cooperation.

Under Part Two, "How to Attack Waste," a four-step plan to cut waste is presented. An explanation of how the plan works, as well as data on waging a campaign against waste and enlisting workers in the war on waste, is given.

FIBRE-LOCK STOP NUTS AND PLATE NUTS

CADMIUM PLATED

HEX NUTS

1/4-28 1/4-20

GOOD CLASS 2 FIT

PLATED NUTS

10-32 1/4-28

VULCANIZED FIBER WASHERS

FIT No. 8, No. 10, 1/4" BOLTS

MACHINE SCREW HEX NUTS—1035 STEEL

1/4-28 10-32 8-32 6-32 Class 2 Fit

CALIFORNIA COMMERCIAL SALES CORPORATION

821 MARKET STREET

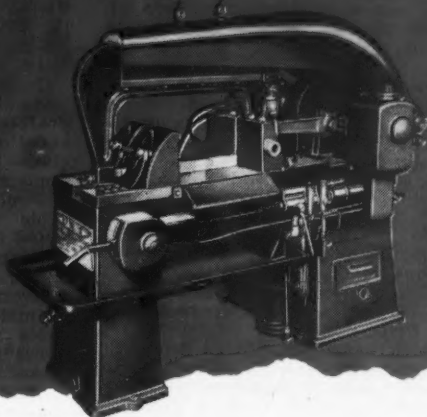
SAN FRANCISCO 3, CALIFORNIA

Progressive Feed

the only correct metal-cutting principle

comparison proves

1. Proper Design — Based on nearly forty years experience in the art of metal cutting.
2. RACINE Machines meet accepted standards of the machine tool industry.
3. Easy to handle—Single lever control of all operating functions.
4. Hydraulic operation and control permits rugged construction —Economic production results.



PROPER application of the cutting tool is vitally important in sawing machines. That is why RACINE pioneered, many years ago, positive, progressive feed throughout the cutting stroke. This is still an exclusive RACINE feature.

Progressive Feed has these advantages. Undue strain is avoided. Each tooth is made to act like a parting tool. More metal is removed on each cutting stroke. That is the reason RACINE Machines cut faster and more accurately.

RACINE Hydraulic Machines incorporate a Dual (*positive and flexible*) Feed Control. Under positive feed the depth of cut is predetermined in every type of stock. Flexible feed enables the blade to cut faster in round stock and the lighter sections of tubing and shaped materials. Dual Feed is exclusively RACINE.

These scientifically accurate, fast cutting machines are available in four models and all capacities from 6" x 6" to 20" x 20". Write for catalog No. 12. At the same time outline the cutting work you have to do. Our engineers will recommend the best machine for the job.

RACINE "Variable Volume" Oil Pumps

A Modern Source of Hydraulic Force

RACINE Oil Hydraulic Pumps in three capacities: 12, 20 and 30 G.P.M. provide from zero to full capacity without relief valves. They operate at pressures from 50 to 1000 lbs. P.S.I. Ask for catalog P-10-C.

RACINE TOOL AND MACHINE COMPANY

1754 State St. Racine, Wisconsin, U. S. A.



RACINE

Molding Technic for Bakelite and Vinylite Plastics. Published by Bakelite Corp., 300 Madison Ave., New York 17, N. Y. 224 pages. Plastic binding, board covers. Price, \$1.50.

In this illustrated handbook, the important phases of commercial molding processes and equipment are discussed. The book contains comprehensive data concerning the fabrication and design of hot-set and cold-set molding materials. Special chapters on cost accounting, molding plant layout, and nomenclature are provided. Numerous up-to-date tables, diagrams, and illustrations supplement the text.

How to Select Foremen and Supervisors. By R. C. Omerdahn. Published by National Foremen's Institute, Inc., Deep River, Conn. 45 pages, 5½ x 8 inches. Cloth binding, semi-flexible covers. Price, \$2.00.

This book has been written primarily for top management, personnel managers, and heads of industrial relations departments to afford them a guide to formulating a selective program for foremen. It should also prove of value to workers and supervisors who would like to make an analysis of themselves for guidance purposes.

The contents of the book are divided into five chapters. Chapter 1 explains what a foreman is, and in Chapter 2 the duties of a foreman are discussed. Chapter 3 describes the old method of selecting foremen, while Chapter 4 covers in detail a new method of selecting foremen. The latter chapter is broken down into five subheadings as follows: (A) Preliminary Selection of Candidates, (B) Establishing Tests, (C) Establishing Minimum Test Requirements, (D) Character Investigation, and (E) Review of Record and Final Approval. The fifth and final chapter

of the book affords a resume and conclusion of the material presented in the preceding chapters.

Mechanics Vest Pocket Reference Book. By John H. Wolfe and Everett R. Phelp. Published by Ziff-Davis Publishing Co., 274 Madison Ave., New York, N. Y. Price, \$1.25.

Compiled primarily for the use of toolmakers, diemakers, machinists, draftsmen, apprentices, engineers, and vocational students, this handbook includes a table of all six natural trigonometric functions, given to five decimal places, with an added logarithmic table simplifying interpolation. Also listed in the table of contents are twist drill and letter sizes, decimal equivalents, areas, volumes, screw threads, hardness conversion table, wire gauges, ball racer diameters, grinding wheel hardness table and other gear data. Areas and pressures for hydraulic cylinders, and many other formulas and tables.

The book is illustrated with many diagrams and is completely indexed.

Operating an Engine Lathe. By Ray S. Lindenmeyer. Published by Science and Mechanics, 154 E. Erie St., Chicago 11, Ill. 64 pages. Heavy paper covers. Price, single copy, 50 cents; in lots of fifty or more, 25 cents per copy.

More men are now becoming machine tool operators than at any other time in the history of the nation. To offer definite and practical aid to these men, the series of lessons on operating an engine lathe contained in this handbook has been prepared.

The aim is to give the beginner, in condensed form, the facts of science and general information that underlie successful lathe operation. The course is chiefly intended to supply a background which will make the operator resourceful and self-reliant and enable him to meet successfully new situations and demands made on him.

The lessons provided deal with the essential things that the beginner should know about the engine lathe itself, its attachments, and the tools used in lathe work. They also include instructions on what the operator should be able to do, with easy projects for practice.

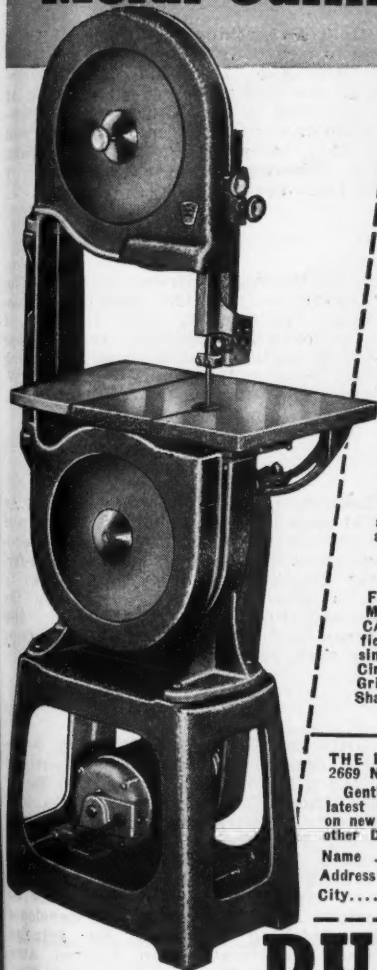
Contained in the handbook is a total of 51 lessons, practically all of which are illustrated with line drawings or photographs or both.



PRESSES
FEEDS
AUTOMATIC
EQUIPMENT

The V & O Press Company, Incorporated
HUDSON, NEW YORK

A basically improved low-cost **Metal Cutting BAND SAW**



Despite its unusually low price, this heavy DURO 16-inch production Metal Cutting Band Saw has many special features not found in machines costing several times as much. It is ideal for cutting tubing, extruded shapes, bar stocks, metal sheets, casting gates, plastics, brake linings, hard rubber, slate, fibre and many other materials. Can be adjusted to obtain standard wood cutting speeds by a flip of a lever. Some of its special features include: Heavy machined cast iron trunnion; special roller blade guides which reduce blade crystallization and lessen blade breakage; new design which permits all adjustments to be made from front while saw is in operation; New Departure Ball Bearings; machined dove-tailed ways with adjustable steel gibs; many other advantages. Metal cutting speeds: 230 and 596 R.P.M. Wood-cutting speeds: 2300 and 5960 R.P.M.

HAS MANY EXCLUSIVE FEATURES

Specifications include: 16" capacity; 10 5/8" capacity under blade; table working surface—23 1/2" x 18"; 45° table tilt; height of base—19"; height of saw—51"; height from table to floor—41 1/2"; wheel diameter—16". Uses 4 New Departure ball bearings, ball bearing blade guides. Has built-in light. Blade is fully guarded. Weight of unit as illustrated, but less motor, 405 lbs. Also available in 15" model.

Send for New DURO Catalog

For full details and prices on the DURO 16" Metal Cutting Band Saw send for latest DURO CATALOG using coupon below. Also lists specifications and prices of complete line of DURO single and multi-spindle Drill Presses, Circular Saws, Jointers, Routers, Shapers, Grinders, Lathes, Scroll Saws, Flexible Shaft Units and Portable Electric Drills.



THE DURO METAL PRODUCTS COMPANY
2669 N. Kildare Ave., Chicago, Illinois

Gentlemen: Please send me **FREE** copy of latest DURO Catalog giving full specifications on new DURO 16" Metal Cutting Band Saw and other DURO Machine Tools.

Name
Address
City.....Zone No.....State.....

DURO TOOLS

MACHINE TOOL DIVISION

ALSO MAKERS OF DURO HAND TOOLS

January, 1945

MODERN MACHINE SHOP 379

New Literature

Hevi Duty Convection Tempering Furnace with temperature range to 1,300 deg. F. is pictured and described in Bulletin HD-744 now available free from Hevi Duty Electric Co., Milwaukee, Wisconsin.

Norton Resinoid Grinding Wheels for steel and annealed malleable castings are described, and several of their uses illustrated in a six page full-color bulletin now available free from the Norton Company, Worcester 6, Massachusetts.

DoAll "Zephyr" High Speed Sawing Machine is described and illustrated in a four-page bulletin now being distributed by Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis 4, Minn. Included are specifications of the machine, as well as data on its use in the sawing of light alloys, plastics, rubber, and sheet metal. Copy free upon request.

Weltronic "Package Unit" Heat Controls. Bulletin No. WTH-44 released by the Weltronic Co., 19500 W. Eight Mile Road, Detroit 19, Mich., contains descriptions, application information, specifications, and features of the improved Weltronic "Package Unit" Heat Controls which provide for dial-controlled infinitely-variable phase-shift regulation of welding currents. Copy free upon request.

"Welcome to Sylvania" is the title of a 32-page booklet which is currently being distributed to every new employee of Sylvania Electric Products Inc., 500 Fifth Ave., New York, N. Y. An outstanding illustration of cordial working relations between management and employees, the booklet, which was prepared by the company's industrial relations department, covers working conditions, employee benefits and opportunities, company organizations, obligations to the public and to stockholders, and provides a glimpse into the future. Copy of booklet is available free to interested individuals upon request.

Zagar Collet Speed Chuck. A mailing piece illustrating and describing the Zagar Collet Speed Chuck for use in turning, facing-off, and second-operation work on bar stock is now being distributed by Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland 17, Ohio. Copy on request.

"Hold Everything" is the title of a bulletin issued by Microcopy Corp., 2800 W. Olive Ave., Burbank, Cal., describing a new and improved application of microfilming to pencil engineering drawings made on transparent paper, as well as other valuable records, documents, maps, drawings, and materials. Copy free upon request.

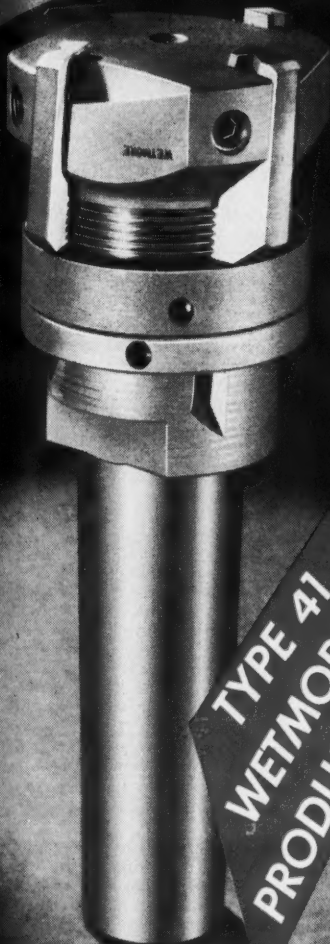
Seam Welder Controls. Bulletin No. WT-40-41 covering the application, operation, specifications and features of its improved full-electronic seam welder controls Models 40 and 41 is now being issued by the Weltronic Co., 19500 W. Eight Mile Road, Detroit 19, Mich. Copy free upon request.

Leonard-Douglas Bendmaster. An eight-page bulletin fully illustrating and describing the Leonard-Douglas Bendmaster—a device for bending non-ferrous tubing from $\frac{3}{8}$ to $1\frac{1}{4}$ inches O. D.—is now being distributed by the Leonard Precision Products Co., 1100 Larson Ave., Garden Grove, Calif. Copy free upon request.

Grits and Grinds; Vol. 36; No. 5 contains three excellent articles pertinent to the grinding field. "Can You Recognize These Common Grinding Faults?" presents illustrations of ground jobs which are imperfect, and explains the causes of the several difficulties. "Cracks in Ground Work" is a very good exposition of the causes for the various kinds of cracks that develop in the finishing of work by grinding. "Basic Information on Coated Abrasives" is the third section of a three-part article containing some highly useful information.

Copy free upon application to Norton Company, Worcester 6, Massachusetts.

THIS WETMORE PRODUCER IS A RUGGED TOOL



**TYPE 41
WETMORE
PRODUSER**

**removes
more
stock—
faster,
better...**

**...and is
adjustable
for wear**

Send for our New Tool Guide
—It is full of data, information
and specifications...Free
to executives and engineers.

Send for the New REAM-MOR blade bulletin for complete details.

WETMORE REAMER CO.

414 North 27th Street, Milwaukee 8, Wis.



Super Shell End and Face Mills. Literature illustrating and describing carbide-tipped shell end and face mills is now available free from the Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich.

"The Rewards of Industrial Efficiency" is the title of a 12-page brochure now being issued by The Fostoria Pressed Steel Corp., Fostoria, Ohio, presenting a step-by-step story of infrared and how it can be efficiently applied to present and future industrial baking, drying, dehydrating, and pre-heating problems. Copy of Flashes No. 344 free upon request.

"Tool Reconditioning and Conversion." A folder now available free from Rutland Tool Service, 13006 Greeley Ave., Detroit 3, Mich., explains in detail how used and obsoleted cutting tools can be reworked to fit present requirements, with a substantial saving in production costs.

Engineering Data. Compiled especially for tool engineers, plant layout men, and methods engineers, a 56-page catalog containing engineering data exclusively on Cincinnati milling, broaching, and cutter sharpening machines is now being distributed by Cincinnati Milling and Grinding Machines, Inc., Cincinnati 9, Ohio. Copy is available free to aforementioned individuals addressing requests on their company letterheads for Publication No. M-1322.

"Woman at Work Speed Production at Wychoff Drawn Steel Company," a four-page pamphlet prepared by Apprentice-Training Service, Bureau of Training, War Manpower Commission, Washington, D. C., describes how management and labor have worked out a plan through which women have been enabled to replace men in a wide variety of jobs in a cold drawn steel mill. Included among the 35 different kinds of operations for which women have been trained are those usually assigned to men in high "seniority" classification, such as the operation of main mill cranes and magnetic testing. Copy of pamphlet free upon request.

Hevi Duty Car Bottom Furnaces are covered as to design, construction features, uses, and so on, in a four-page illustrated bulletin, designated as HD-644, now available free from the Hevi Duty Electric Co., Milwaukee, Wisconsin.

"Submerged Combustion"—an improved method of heating and agitating pickling solutions and evaporating liquids—is thoroughly illustrated and described in a 12-page catalog published by the Submerged Combustion Company of America, Inc., Hammond, Ind. Copy free upon request.

"Blueprint for Industry" is the title of a four-page folder containing engineering information on the constant-speed constant-tension windup machine for wire, cable, rubber, tapes, fabrics, and other continuous materials, which is now being offered by The Industrial Oven Engineering Co., 11621 Detroit Ave., Cleveland 2, Ohio. Copy is available from this firm free upon request.

"The First 25 Years." In commemoration of its Silver Jubilee, the Ex-Cell-O-Corp., 1200 Oakman Blvd., Detroit 6, Mich., is distributing a booklet—"The First 25 Years"—giving the history of the company and an indication of its future plans.

Copy of this profusely illustrated booklet is available free to executives addressing requests on their company letterheads.

Industrial Fractional Horsepower V-Belt Drives. A 44-page handbook regarding industrial fractional horsepower V-belt drives has been published by The B. F. Goodrich Co., Akron, Ohio, and is now available upon request. The booklet notes the trend toward larger sheaves in both fractional horsepower and multiple V-belt drives, describes the construction of B. F. Goodrich fractional horsepower V-belts, and presents prices and data on both sheaves and belts.

An outstanding feature of the handbook is a chapter on the proper selection of fractional horsepower belt drives. Copy by handbook free upon request.

Scully-Jones Tap Chucks



STYLE "A" TAP CHUCKS have
five big advantages for driving taps:

- ◆ Drive by the square—giving a positive drive.
- ◆ Centers by the shank—for correct alignment.
- ◆ Spring collet action—for locking tap in chuck.
- ◆ Four point bearing—giving collet action.
- ◆ A tapered shank—fits any MORSE TAPER HOLE.

RECOMMENDED FOR MAXIMUM RIGIDITY AND CONCENTRICITY IN TAPPING OPERATIONS

SCULLY-JONES AND COMPANY

1901 SO. ROCKWELL STREET • CHICAGO, ILLINOIS, U.S.A.

W & B Spotting & Centering Drills. product of Whitman & Barnes, 2108 W. Fort St., Detroit-16, Mich., are described and illustrated in a four-page circular offered by this firm.

Talide-Tipped Lathe and Grinder Centers. A four-page catalog listing complete prices and specifications of the standard Talide-tipped lathe and grinder centers manufactured by Metal Carbides Corp., Youngstown 5, Ohio, is now being distributed by this firm. Copy of Catalog No. 44-C free upon request.

Bartelt Pedestal Micrometers. A four-page folder now being issued by Bartelt Engineering Co., 1216-G Partridge Ave., Beloit, Wis., illustrates and describes the construction and uses of the various model pedestal micrometers and indicators offered by this firm. Copy free upon request.

"Pratt & Whitney ANPT Pipe Thread Gages—What They Are, What They Do, and How to Use Them" is the title of an eight-page profusely illustrated circular, designated as the No. 477, now available free from Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Connecticut.

Sturtevant Heavy Duty Heaters. Designated as the No. 462, a 36-page catalog containing illustrated, descriptive, and engineering information on heavy duty blast heaters has been published by the B. F. Sturtevant Co., Hyde Park, Boston, Mass. Copy free upon request.

Tenite II Casting. The casting of a thermoplastic material for forming tools is discussed in a booklet, "Tenite II Casting," published by the Tennessee Eastman Corp., Kingsport, Tenn. Issued for the benefit of tool engineers, the booklet provides a detailed description of the procedure to be followed in casting Tenite II, with specific reference to the casting of a drop-hammer punch. Copy free upon request.

"Doyle Approved Industrial-Commercial Vacuum Cleaning." A folder descriptive of portable vacuum cleaning equipment for industrial and commercial uses is now being distributed by the Doyle Vacuum Cleaner Co., 3225 Stevens St., S. W., Grand Rapids 7, Mich. Copy free upon request.

Victory Tool Shanks. An attractive 12-page catalog featuring illustrated, descriptive, and tabular information, including prices, concerning its various series of Victory Tool Shanks which are cast to shape from a high tensile strength Meehanite Metal is now being distributed by The Cooper-Bessemer Corp., Mount Vernon, Ohio. Copy free upon request.

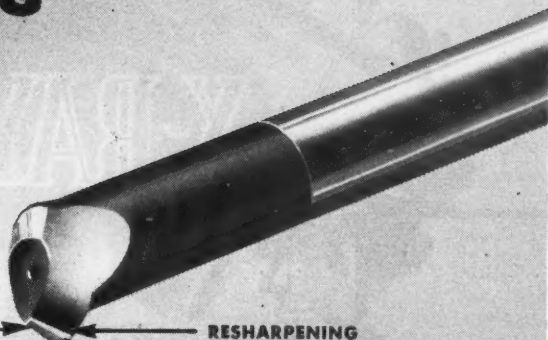
"Precision in Millionths" is the title of an illustrated bulletin now being issued by the Fonda Gage Co., Stamford, Conn., describing a new type of finish for gage blocks which is claimed to maintain precision accuracy in gage blocks over extended periods of use. Copy of the bulletin, which also lists the Fonda standard lines of gage blocks (including metric sets) is available free upon request.

Atkins Curled-Chip Manual. A manual containing basic information on how to operate metal sawing machines at full efficiency is now being offered by E. C. Atkins & Co., 466 S. Illinois St., Indianapolis 9, Ind. Included in the manual are complete and concise facts regarding Atkins Curled-Chip Saws together with a compilation of actual on-the-job Curled-Chip saw production on various types of work. Copy free upon request.

Richards-Wilcox "Zig-Zag" Continuous Power Conveyor, a unique conveyor of flexible design especially adapted to the handling of loads at slow speeds through degreasers, automatic washers, driers, ovens, test tanks, and so on, is fully described in a 36-page catalog published by the Richards-Wilcox Mfg. Co., Aurora, Ill. Photographs show conveyor being used for handling steel products, electric appliances, airplane parts, and other materials. Copy of Catalog No. 2035 free upon request.

WHY *You* SHOULD BE USING

BOKUM BORING TOOLS



HELICAL RELIEF
maintains constant
clearance angle

RESHARPENING
is confined to one face

FINISH LAPPED
cutting surfaces produce better
bores with faster feeds

The cutting edge forms an angle which will always cut free because of the special helical backed-off form of the front end of the tool.

Resharpener never destroys the original free-cutting action of the tool.

Style A Tools (shown above) are for boring through holes—made in sizes small enough to bore $\frac{1}{8}$ " holes, to sizes husky enough to bore extremely large holes.

Style B Tools are for boring and bottoming blind holes from $\frac{3}{16}$ " dia. up.

Style C Tools are for internal threading from $\frac{7}{32}$ " dia. up.

BUY WAR BONDS



Ask for Catalog B-1139 for Super High Speed Tools
and for B-398 for Carbide Tipped

BOKUM TOOL CO.

14775 WILDEMERE AVE. • DETROIT 21, MICH.



We can see with the naked eye that the Payroll Savings Plan provides the most stable method of war financing! Under the X-ray of sound economics other important advantages appear.

A check on inflation, the Payroll Savings Plan helps industry to build the economic stability on which future profits depend. Billions, invested through this greatest of all savings plans, represent a "high level" market for postwar products. Putting over this plan *together* also establishes a firmer, friendlier relationship between management and labor.

To working America the Payroll Savings Plan offers many opportunities. Through this systematic "investment in victory," homes, education for their children and nest eggs for their old age are within the reach of millions.

These benefits to management and labor are national benefits. Instilling the thrift principle in the mind of the working men and women, the Payroll Savings Plan assures their future security—and is a definite contribution to the prosperity of postwar America!

The Treasury Department acknowledges with appreciation the publication of this message by

MODERN MACHINE SHOP

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council.

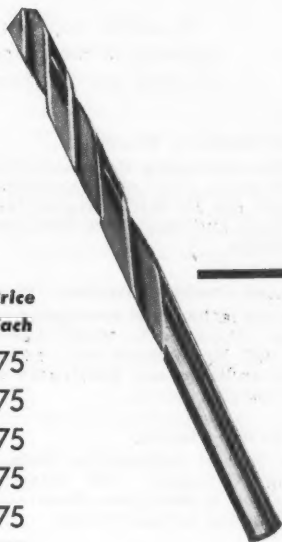
Immediate Delivery

No. 1 to 60

New High Speed

Long Length

DRILLS



No. by Gage	Length	Our Price Net Each
1 to 10	6¼	\$.75
11 to 20	5¾	.75
21 to 30	5⅜	.75
31 to 40	5¼	.75
41 to 50	4½	.75
51 to 60	4¼	.75

**If you buy 60
drills or more —
20% discount.**

VICTOR MACHINERY EXCHANGE, INC.

251 CENTER STREET Phone: CAnal 6-5575 NEW YORK, N. Y.



FOR YOUR CATALOG LIBRARY

*To obtain copies of the catalogs listed here,
indicate on the coupon the number of the item
in which you are interested and mail as directed.*

1. Diamond Abrasive Wheels

Felker Manufacturing Company, 1119 Border Avenue, Torrance, California, has issued the DI-MET catalog featuring metal and resinoid bonded diamond wheels.

2. Engine and Toolroom Lathes

All types of lathes that are manufactured by the South Bend Lathe Works, 427 E. Madison St., South Bend 22, Indiana, are illustrated in the new catalog 100-D.

3. Toggle Action Clamps

Bulletin No. 43 offered by Detroit Stamping Company, 349 Midland Ave., Detroit 3, Michigan, illustrates many clamping arrangements.

4. Industrial Clutches and Couplings

The Hilliard Corporation, 117 W. Fourth St., Elmira, New York, offers a series of six illustrated bulletins featuring their complete line of Industrial Clutches and Couplings.

5. Chucks

Catalog 600, issued by Westcott Chuck Co., 720 E. Walnut St., Oneida, New York, outlines details of Westcott Chucks.

6. Band Saw Welders

Weldex Inc., 7327 McDonald Ave., Detroit, Mich., has available catalog featuring Weldex No. 141 Band Saw Welder.

7. Taps and Dies

Catalog D-42-B issued by The National Acme Co., 170 East 131st St., Cleveland, Ohio, gives complete information on automatic taps and dies.

8. Special Cutting Tools

Catalog 8-B is being offered by The Weldon Tool Co., 3000 Woodhill Road, Cleveland 4, Ohio.

9. Hydraulic Press

K. R. Wilson, 215-217 Main St., Buffalo 3, New York, has issued a 24-page book on hydraulic presses.

10. Friction Sawing

The Tannevitz Works, Grand Rapids 4, Mich., is issuing a book on Friction Sawing, written by Arthur A. Schwartz, Chief Tool Research Engineer, Bell Aircraft Corporation.

11. Files

Carson-Newton Co., 61-71 Mill St., Belleville, New Jersey, has issued a new catalog on files.

12. Flute Grinder

Bulletin 50-F is offered by The Wardwell Manufacturing Co., 3166 Fulton Road, Cleveland 9, Ohio.

13. Clamps

A catalog on clamps has been issued by The Cincinnati Tool Company, 1947 Waverly Ave., Cincinnati 12, Ohio.

14. Portable Grinder

"Facts and Figures," a 20-page booklet on grinding has been issued by Precise Products Company, 1345 Clark Street, Racine, Wisconsin.

15. Grinding Milling Cutters

A new book on grinding milling cutters is offered by The O K Tool Co., Shelton, Connecticut.

16. Industrial Chilling Machine

Bulletin No. 1-4, titled "Cold Treating Practice," and containing information on how and where to use sub-zero temperatures has been issued by Deepfreeze Div. of Motor Products Corp., 2318 Davis St., North Chicago, Illinois.

17. Tap and Die Holders

New Catalog No. 5, featuring Alco tap and die holders, has been released by The Alco Tool Co., 152 Birdseye St., Bridgeport, Connecticut.

18. Dust Collector

The No. 2 Filtaire Portable Dust Collector is detailed in Bulletin No. 444, issued by Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Massachusetts.

19. Metal Cutting Saws

Circular Tool Co., Inc., Providence 5, R. I., has issued Catalog K featuring circular metal cutting saws.

20. Hand Book of Precision Measurement

A 60-page "Hand Book of Precision Measurement" has been released by Jansson Gage Co., 19214 Glendale Ave., Detroit 23, Mich.

21. Speed Lathes

Catalog No. 440 shows applications of Schauer Speed Lathes. Schauer Machine Co., 2060 Reading Rd., Cincinnati 2, Ohio.

22. Balancing Ways

Anderson Bros. Mfg. Co., 1926 Kishwaukee St., Rockford, Ill., has available bulletin detailing Anderson Pillow Block Type Balancing Ways.

23. Expanding Mandrels

Bulletin 1043, issued by W. H. Nicholson & Co., 136 Oregon St., Wilkes-Barre, Pa., outlines details on Nicholson Expanding Mandrels.

24. Dynamic Balancing Machines

Details of Bear Dynamic Balancing Machines are presented in catalog available from Bear Mfg. Co., Ind. Div., Rock Island, Illinois.

Print plainly in filling out coupon for literature.

MODERN MACHINE SHOP

431 Main St., Cincinnati 2, Ohio

I am interested in receiving the following literature reviewed in your January issue.

No. No. No. No. No.

(Insert numbers denoting literature you want.)

Name Title

Company

Company Address

City State

SERVICES DIRECTORY

**GRINDING • STAMPINGS • TOOL and DIE WORK
MACHINE WORK • CASTINGS • HEAT-TREATING
FORGINGS • EMPLOYMENT • BUSINESS • ETC.**

PRECISION GROUND GEARS CAMS THREADS SPLINES

Excellent facilities for grinding gears, cams, threads and splines on a contract basis.

SEND BLUEPRINTS FOR ESTIMATE

**HARTFORD SPECIAL
MACHINERY COMPANY**
Hartford, Conn.

CENTERLESS GRINDING

Straight, Cylindrical, Shoulder, Profile, and Multiple Diameters . . . Ground Taper Pins
Screw Machine Products. Heat treated and ground if necessary. Improved and expanded facilities insure prompt and accurate service.
Send blueprints or samples for estimates.

PORTER MACHINE CO.
3139 Enyart Ave., Oakley, Cincinnati, Ohio

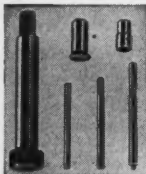
A COMPLETE PRECISION GRINDING SERVICE

CENTERLESS GRINDING
INTERNAL CYLINDRICAL
GRINDING
EXTERNAL CYLINDRICAL
GRINDING
BLANCHARD SURFACE
GRINDING
PLAIN SURFACE GRINDING
THREAD GRINDING

Send Blueprint Sketch or Samples for Quotation



**ACE
MANUFACTURING CORP.**
1235 E. Erie Avenue
Philadelphia, Pa.



PATTERNS

Wood and Metal — also Match Plates.
For all kinds of castings—large or small.
Estimates on Request.

GENERAL PATTERN WORKS
2231 Buck St., North of Harrison Ave.
Phone MAin 4751 Cincinnati, Ohio

AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

. . . up to 2" diameter — any material —
small or large quantities. Prompt service.

IMSANDE SCREW PRODUCTS CO.
3517 Cardiff Ave., Oakley, Cincinnati, Ohio

CENTERLESS GRINDING

SINCE 1925

CINCINNATI

ICE PICK & TONG MFG. CO.
118 BURROWS ST. • CINCINNATI, O.

GRIND THE

*Eastern Centerless
Way*

Our new plant with
increased facilities
assures

PROMPT SERVICE

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

From Simplest to Most Exacting

Jigs, Gauges, Tools, Fixtures.
Designing and Engineering.
Light Manufacturing.
Thirty Years of Service.

SCHMIDGALL MFG. CO.

307 Cass St.

Peoria 2, Ill.

BAKELITE SILENT GEAR SERVICE

ALL SIZE BLANKS IN STOCK.

Teeth Cut To Your Specifications.
Prompt Delivery. Write for quotation.

GREAVES MACHINE TOOL COMPANY

2009 Eastern Avenue

Cincinnati, Ohio

PRECISION FORM GRINDING

Specialists in grinding Circular and Flat FORM-TOOLS, FORM Counterbores, FORM Flat-Drills, and related types of FORM grinding. Also step-grinding of Tungsten and Molybdenum Rods.

Send Prints for Quotation and Delivery

J. & S. TOOL CO., 477 Main St., E. Orange 5, N. J.
(Makers of J. & S. Radies and Angle Dressing Tools)

SECOND OPERATIONS

**MILLING, PRECISION CYLINDRICAL
AND FLAT GRINDING, LAPPING
OF HOLES, TAPPING.**

Send blueprints and samples for estimates.

SAXL INSTRUMENT CO.

38-40 James St., East Providence 14, R. I.

THREAD MILLING

*Production Milling of Precision
Threads—internal and external. Ca-
pacity range: 1/2" to 12" internal and
external diameters—wide range in
itches and forms.*

Send blueprints for quotations.

Shields Mfg. Company, Inc.

38-09 24TH ST., LONG ISLAND CITY 1, N. Y.

CENTERLESS

**INTERNAL - EXTERNAL
GRINDING
LATHE WORK**

Send Blueprint for Quotations

FOULK ENGINEERING CO.
4208 Airport Road Cincinnati 26, Ohio

CAPACITY OPEN

For: Hand Screw Machines, Turret Lathes,
1/8" to 3 1/2" Bar, 20" Chucking.

Supplemental Milling, Drilling, etc.

BENTON HARBOR ENGINEERING WORKS

309 E. Main St. Benton Harbor, Michigan

TOOL

OR

DIE

DESIGNERS

Ohio Manufacturer with Die-Cast Division, needs Tool or Die Designers to design Die-Cast Dies, Tools, Jigs, and Fixtures. Broad experience with Machine Tools essential. Some Mechanical and Hydraulic Engineering experience advantageous. Living conditions good in small town, or near-by medium sized city. Excellent post-war opportunities. Write Box 129, care of Modern Machine Shop, 431 Main St., Cincinnati 2, Ohio.



WHERE TO GET IT

Abrasive Cloth, Paper, Discs, Belts, Stones, Etc..

199, 171, 255, 52, 63

Adapters, 345

Air-Operated Equipment (Look for specific item)

Alloys, 26, 27, 212, 65

Angle Irons, 266

Arbors, 80, 17

Balancing Machines, 7

Balancing Ways, 307

Bases, Machine, 329

Bearings, Ball, Front Cover, 329

Bearings, Oilless, 194

Bearings, Roller, 161, Front Cover, 329, 1

Bearings, Sleeve, 161

Bearings, Thrust, Front Cover, 329

Benches, Work, 400

Bench Legs, 270

Bench Tops, 270

Bending Devices, 231, 263, 87

Bending Machines, 184, 263

Bins, 330

Blades, Cutting-Off, 174

Blocks, V, 266

Bolts, 331

Borescopes, 164

Boring and Facing Machines, Horizontal, 3

Boring Bars, 223, 79, 381

Boring, Drilling and Milling Machines, Horizontal, 42, 43

Boring Fixtures, 321

Boring Heads, 307, 335, 341

Boring Machines, 3

Boxes, Shop, 335, 270, 330

Brakes, Press and Bending, 231, 137

Broaches, 185, 133, 245, 355

Broaching Fixtures, 263

Broaching Machines, 133, 8-9

Buffers, Portable Electric, 404, 49

Buffing Machines, 49, 404

Burring Machines, 291

Burs, 309, 251

Bushings, Drill Jig, 166, 324, 331, 6

Carbides, 104, 28, 367, 369, 143

Centering Machines, Automatic, 16

Centers, Bench, 91

Centers, Lathe, Planer, Millor, Etc., 269, 102,

313, 326, 397

Chains, 334

Checking Rolls, 277

Chippers, Portable Electric, 57

Chilling Equipment, Industrial, 353

Chisels, 319

Chucking and Indexing Fixtures, Second Cover, 285, 71, 80, 248

Chucking Machines, Automatic, 73

Chucks, Collet, 223, 288

Chucks, Drill, 80, 148, 365, 33

Chucks, Lathe, Second Cover, 285, 207

Chucks, Magnetic, 101, 290, 76, 207

Chucks, Tap, 375, 383

Chucks, Wire, 309

Clamps, 215, 319, 324, 38

Clamps, Air, 295

Cleaners, Vacuum, 187, 323

Cleaning Equipment, 187, 48

Clutches, 242, 299

Collet Fixtures, 71

Collets, 41, 223, 71

Comparators, 177, 16

Compressors, Air and Gas, 197

Controlling Devices, 204

Coolants, 72, 77

Coolant Units and Systems, 175, 154, Second Cover, 101, 264

Counterbores, 218, 147, 301, 305, 90, 357

Countersinks, 336

Couplings, Flexible, 208, 305, 368

Cranes, 176

Cut-Off Machines, 208, 249, 329, 25

Cut-Off Wheels, 255

Cutter Sharpening Machines, 24, 271

Cutters, Milling, 205, 223, 104, 292, 301, 79, 90

357, 254

Cylinders, Hydraulic and Pneumatic, 197, 233, Second Cover, 87, 89

Demagnetizers, 325

Diamonds and Diamond Tools, 224, 267, 134, 90, 94, 335, 44

Diamond Wheels, 114, 94

Die Heads, Threading, 2, 155, 16, 31

Diemakers' Supplies, 317, 15, 28, 29

Die Making Machines, 271, 327

Dies, 275, 301, 281, 300, 73, 313, 318
Die Sets, 275, 291, 15
Dividing Heads, 207
Dressing Fixtures, Grinding Wheel, 196, 307, 320, 100
Dressing Tools, 221, 307, 196, 276, 100
Drill Heads, 200, 244, 327, 33
Drilling and Tapping Units, 81
Drilling Attachments, 219, 168, 148, 311, 318, 321, 33

Drilling Machines, Automatic, 93
Drilling Machines, Bench, 54
Drilling Machines, Multiple Spindle, 83
Drilling Machines, Radial, 135, 14, 141
Drilling Machines, Vertical, 135, 22, 54
Drilling Units, 81, 25
Drills, Center, Core, Twist, Square, Etc., 147, 301, 292, 305, 68, 46, 387, 395
Drills, Portable Electric, 379
Drives, Motor, 261, 50
Duplicating Machines, 105, 313
Dust Control Equipment, 101, 24, 404

Electroplating Equipment, 217
Engraving Machines, 105, 291, 297, 250
Etchers, 105, 291, 325, 373

Feed Units, Hydraulic, 189
Files, 229, 151, 315, 60, 346
Files, Band, 101
Files, Portable Electric, 57
Files, Rotary, 229, 159, 251, 296, 309, 19, 351
Filing Machines, 59
Flexible Shaft Equipment, 165, 140, 19, 25
Forgings, 82
Forming Devices, Wheel and Tool, 366
Forming Machines, 137, 87
Furnaces, Heat-Treating, 107, 308

Gage Blocks, 193, 225, 253, 101, 51
Gage Handles, 317, 337
Gages, 177, 193, 213, 139, 282, 292, 294, 299, 300, 90, 91, 317, 319, 62, 256
Gear Burring Machines, 75
Gear Chamfering Machines, 75
Gear Cutting Machines, 331, 11
Gears and Gear Units, 302, 305, 306, 323, 5, 250
Gear Tooth Round Machines, 195
Generators, 197
Grinders, Abrasive Band and Disc, 171, 78
Grinders, Abrasive Belt, 311, 399
Grinders, Air, 188, 317
Grinders, Bench, 343
Grinders, Carbide Tool, 333, 32
Grinders, Centerless, 12-13, 280, 8-9
Grinders, Cutter and Tool, 236, 271, 8, 9
Grinders, Cylindrical, 8, 9, 12, 13
Grinders, Drill, 271, 312
Grinders, Face Mill, 271, 17
Grinders, Flute, 316
Grinders, Pedestal, 261, 108, 32, 49
Grinders, Portable and Tool Post, 163, 188, 317
Grinders, Portable Electric, 328, 35, 39, 344
Grinders, Snagging, 255, 49
Grinders, Surface, 273, 101, 103, 111, 119, 278,

67, 315, 30, 343
Grinders, Swing Frame, 288
Grinders, Tap, 264, 24
Grinders, Thread, 302, 16
Grinders, Tool Bit, 169
Grinders, Universal, 8, 9, 12, 13
Grinding Fixtures and Attachments, 91
Grinding Wheels, 171, 202, 203, 255, 143, 101, 112, 113, 119, 21, 371
Guns, Air, 309

Hammers, 268
Hardness Testing Devices, 186, 149
Hinges, 210, 295
Hobbing Machines, 315
Hobs, 301
Hoisting and Conveying Machinery, 176
Holders, Die, 365
Holders, Tool, 122, 340, 34, 359, 365
Holders, Type, 354
Hole Checking Machines, 91
Hole Locator, 310
Hones, Portable Cylinder, 255
Honing Machines, 265
Hopper Units, Motorized, 297
Hydraulic Equipment (Look for specific item)

Indicators, 201, 139, 117, 347
Inspection Devices, 139, 164, 277, 281, 319, 18, 45, 373, 347

Jacks, 337
Jig Bore, 69, 17
Jigs and Fixtures, 300, 38, 361
Joints, Universal, 216, 243, 219

Keyway Cutting Machines, 278, 321, 264
Knurls, 118

Lapping Compounds, 337
Lapping Machines, 8-9, 57
Lathes, Automatic, 141, 7, 16, 23
Lathes, Bench, 167, 296, 325, 64, 360
Lathes, Engine and Toolroom, 183, 152, Third Cover, 109, 120, 303, 333, 274, 23, 55, 56, 262
Lathes, Polishing, 261, 25
Lathes, Speed, 172, 241, 120, 49
Lathes, Turret, 152, 70, 7
Lathes, Vertical Turret, 16
Lathe Units, Collet Head, 88
Layout Materials, 230, 138, 331
Levels, 288, 297, 337
Lighting Equipment, 338
Lubricants, 220, 72, 77
Lubricating Systems, 80

Magnifiers, 210
Mallets, Rawhide, 268
Mandrels, Expanding, 334, 374
Markers, Roll, 275, 313
Marking Machines, 297, 258, 118
Meters, Air Velocity, 257
Metallizing Equipment, 293
Milling Fixtures, 321
Milling Machine Attachments, 93

Milling Machines, Automatic, 16
 Milling Machines, Bench, 81
 Milling Machines, Hand, 234
 Milling Machines, Horizontal, 105, 81, 8-9, 53, 61
 Milling Machines, Rotary Head, 17
 Milling Machines, Universal, 8, 9
 Milling Machines, Vertical, 10
 Mills, End, 147, 97, 104, 90, 357
 Mills, Hollow, 218, 146, 38
 Molds, 212
 Motors, 197, 261, 333, 25, 50
 Mounted Points and Wheels, 112, 113, 255

Nibblers, 232, 324
 Numbering Machines, 118, 287
 Nuts, 376

Oilers, 335
 Oil Groovers, 240
 Oils, Cutting, 220, 101, 77, 72

Pans, Tote, 306
 Parallels, 266
 Parts, Machine, Aircraft, Production, Etc., 235
 Pinion Cutting Machines, 331
 Planers, 106, 4
 Plates, Angle, 100
 Plates, Lapping, 283
 Plates, Surface, 283
 Plating Equipment and Supplies, 217
 Polishing Wheels, 202-203
 Powders, Metal, 101
 Presses, Air, Second Cover
 Presses, Arbor, 362
 Presses, Foot, 263, 325, 362
 Presses, Hydraulic, 89
 Presses, Power, 137, 284, 306
 Presses, Punch, 137, 110, 306
 Presses, Quenching, 89
 Projectors, Optical, 18
 Pullers, 259, 295
 Pulleys, 101
 Pumps, Coolant and Lubricant, 175, 154, Second Cover
 Pumps, Liquid Transfer, 48
 Punches, 303, 319
 Punch Press Feeds, 378

Racks, Bar and Tube, 358
 Rasps, 309
 Reamers, 223, 147, 301, 90, 59, 370, 381
 Reamers, Portable Electric, 348
 Rectifiers, 217
 Regulators, 89
 Resurfacing Materials, Floor, 332
 Riveting Machines, 233, 303, 89

Safety Equipment, Press, 350
 Sanders, Portable Electric, 57
 Sanders, Portable Pneumatic, 197
 Sanding Machines, 197
 Saw Blades, Band, 101, 279, 92, 356
 Saw Blades, Circular, 179, 84
 Saw Blades, Hack, 173, 279, 85, 314, 45, 356, 372

Sawing Machines, Band, 209, 249, 101, 66, 96, 25, 45, 379
 Sawing Machines, Hack, 227, 40, 377
 Saws, Portable Electric, 57
 Scrapers, Hand and Power, 57
 Screw Drivers, Hand, 115
 Screw-Inserting Machines, Automatic, 93
 Screw Machines, Automatic, 105
 Screws, Cap, Set, Socket and Machine, 145, Fourth Cover, 331, 20, 361
 Screws, Plug, 331
 Screws, Self-Tapping, 145
 Screws, Transfer, 214, 150
 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, Etc., 390, 391
 Shaper-Planers, 106
 Shapers, 106, 81, 339, 47
 Sharpening Fixtures, 170, 272
 Shearing Machines, 231, 303, 58, 362
 Shims, 250
 Sine Bar Fixtures, 211, 339, 364
 Sine Bars, 211, 364, 339
 Slotting Machines, 232, 106, 260
 Speed Reducers, 299
 Spline and Index Fixtures, 319
 Spot Facers, 147, 305
 Springs, 317
 Stampings, Pressed Metal, 214, 275
 Stamps, 275, 283, 313, 327
 Steel, Cutting, 237
 Steel, Die, 275
 Steel, General Purpose, 181, 65, 26-27
 Steel, Sheet, 304, 65, 26-27
 Steel Stock, Ground Flat, 304, 28-29
 Surfacing Machines, Abrasive, 278, 25

Tables, Rotary and Index, 287, 313
 Tapping Attachments, 219, 73, 323, 19, 375, 380
 Tapping Machines, 246, 93, 375
 Tapping Machines, Automatic, 93
 Tapping Units, 323, 375
 Taps, 157, 247, 98, 119, 286, 86, 311
 Taps, Collapsible, 155, 73
 Thread Checking Machines, 91
 Threading Attachments, 339
 Threading Machines, 2, 95, 155
 Tool Attachments, Angle, 223, 36-37, 349
 Tool Bits, 181
 Tool Blanks, 292, 367, 369
 Tools, Deburring, 287
 Tools, Form, 289
 Tools, Special Cutting, 223, 116, 74, 79, 90, 357
 Tools, Threading, 2, 339
 Turrets, Lathe, 36, 37, 70, 223, 88

Valves, 197, 80, 89
 Vises, Bench and Machine, 168, 257, 89, 311, 322, 337, 17, 342, 352

Welding Equipment and Supplies, 238-9, 153, 298, 302, 321
 Wire and Band Cutting Machines, 278
 Wire Stripping Machines, 228
 Wrenches, 219, 259, 283, 82, 363, 252

LONG LENGTH

HIGH SPEED DRILLS

9" Cutting Flute
12" Long



Prompt Delivery

Size Inches	Length Overall Inches	Length of Flute Inches	Our Price Net Each High Speed
1/8	12	9	\$3.00
9/64	12	9	3.00
5/32	12	9	3.00
11/64	12	9	3.00
3/16	12	9	3.00
13/64	12	9	3.25
7/32	12	9	3.25
15/64	12	9	3.25
1/4	12	9	3.50
17/64	12	9	3.50
9/32	12	9	3.50
19/64	12	9	3.50
5/16	12	9	3.75
21/64	12	9	3.75
11/32	12	9	3.75
23/64	12	9	3.75
3/8	12	9	4.00
25/64	12	9	4.00
13/32	12	9	4.25
27/64	12	9	4.25
7/16	12	9	4.50
29/64	12	9	4.75
15/32	12	9	4.75
31/64	12	9	5.00
1/2	12	9	5.00

VICTOR MACHINERY EXCHANGE, INC.

251 CENTER STREET Phone: CAnal 6-5575 NEW YORK, N. Y.



Michigan Model 860-A Gear Finishers. A complete line of improved (Model 860-A) gear finishing machines for spur and helical gears up to 18 inches in diameter is described in a technical bulletin now available from the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Michigan.

A discussion of the principles of crossed-axis gear cutting is included in the bulletin. "Curve-shaving"—a proc-

ess for slightly reducing thickness toward the ends of gear teeth to prevent concentration of leads on the end of the teeth—is also discussed and its application to the Model 860-A gear finisher briefly described. In addition, complete specifications of the three available sizes of machines, together with a list of standard and special equipment items, are presented. Copy of Bulletin No. 860A44 free.

These exclusive features give MOTOR TOOL *Ball and Roller Bearings* LIVE CENTERS EXTRA LONG LIFE

In addition to standard morse taper sizes (1 to 7, inclusive) carried in stock . . .

Precision-built MOTOR TOOL LIVE CENTERS are constantly being developed by our engineering staff for numerous SPECIAL machining operations. Spindles, heads, tapers and points are designed to exactly fit the work to be done.

Whatever your needs—standard or SPECIAL—consult with our engineers. Know the speedier production and greater economy of using MOTOR TOOL LIVE CENTERS—the centers that will not burn out or break down no matter how long or how tough the job.

LOCK FOR REDRESSING POINT WITHOUT DISMANTLING.

NEEDLE BEARING FOR TRUE RUNNING AND PREVENTION OF CHATTER.

CORK THRUST PAD COMPENSATOR FOR HEAT AND EXPANSION OF WORK.

HEAVY DUTY BALL BEARING FOR GREATER THRUST LOAD.

HEAVY DUTY ROLLER BEARING FOR GREATER RADIAL LOAD CAPACITY.

GREASE SEAL TO RETAIN LUBRICANT AND KEEP OUT FOREIGN MATTER.

LARGE SPINDLE FOR STURDINESS AND GREATER LOAD.



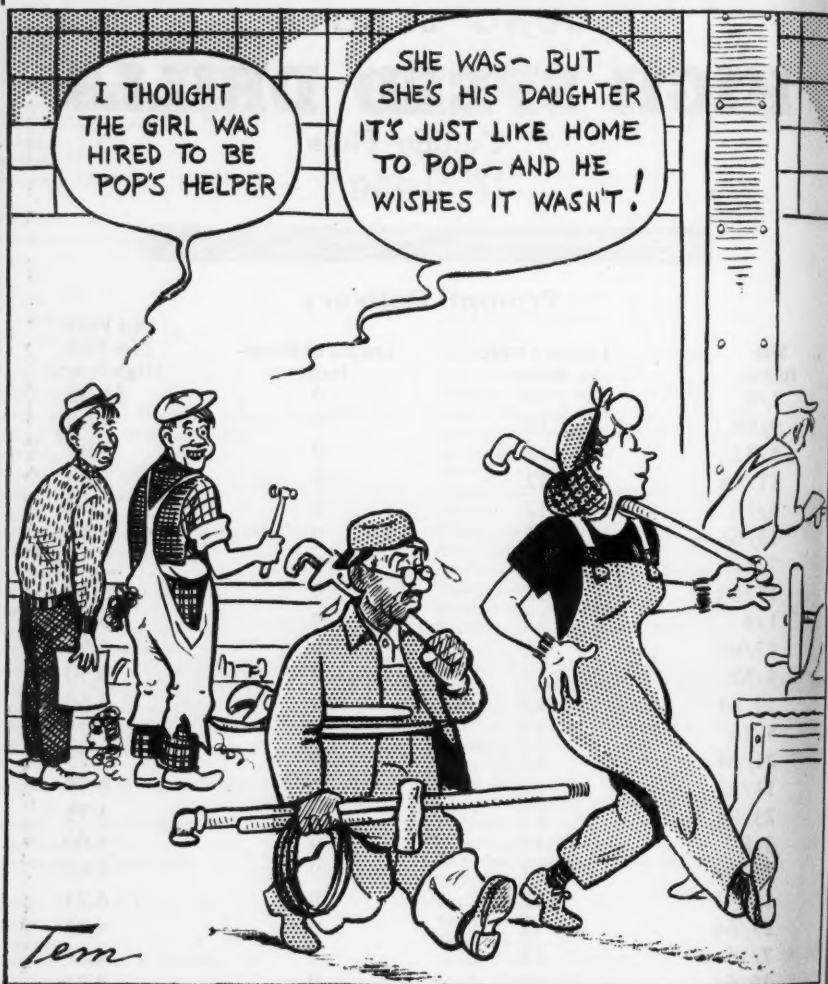
BULL NOSE MALE HEAD



BULL NOSE FEMALE HEAD

MOTOR TOOL MANUFACTURING CO.
METAL CUTTING TOOLS
7771 CORTLAND AVENUE • DETROIT 4, MICHIGAN

*Make it a Rule
to Call Motor Tool*



Michigan Model 860-A Gear Finishers. A complete line of improved (Model 860-A) gear finishing machines for spur and helical gears up to 18 inches in diameter is described in a technical bulletin now available from the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Michigan.

A discussion of the principles of crossed-axis gear cutting is included in the bulletin. "Curve-shaving"—a proc-

ess for slightly reducing thickness toward the ends of gear teeth to prevent concentration of leads on the end of the teeth—is also discussed and its application to the Model 860-A gear finisher briefly described. In addition, complete specifications of the three available sizes of machines, together with a list of standard and special equipment items, are presented. Copy of Bulletin No. 860A44 free.

These exclusive features give MOTOR TOOL *Ball and Roller Bearings* LIVE CENTERS EXTRA LONG LIFE

In addition to standard morse taper sizes (1 to 7, inclusive) carried in stock . . .

Precision-built MOTOR TOOL LIVE CENTERS are constantly being developed by our engineering staff for numerous SPECIAL machining operations. Spindles, heads, tapers and points are designed to exactly fit the work to be done.

Whatever your needs—standard or SPECIAL—consult with our engineers. Know the speedier production and greater economy of using MOTOR TOOL LIVE CENTERS—the centers that will not burn out or break down no matter how long or how tough the job.

LOCK FOR REDRESSING
POINT WITHOUT
DISMANTLING.

NEEDLE BEARING FOR
TRUE RUNNING AND
PREVENTION OF CHATTER.

CORK THRUST PAD COM-
PENSATOR FOR HEAT AND
EXPANSION OF WORK.

HEAVY DUTY BALL
BEARING FOR GREATER
THRUST LOAD.

HEAVY DUTY ROLLER
BEARING FOR GREATER
RADIAL LOAD CAPACITY.

GREASE SEAL TO
RETAIN LUBRICANT
AND KEEP OUT
FOREIGN MATTER.

LARGE SPINDLE
FOR STURDINESS AND
GREATER LOAD.



BULL NOSE
MALE HEAD



BULL NOSE
FEMALE HEAD

MOTOR TOOL MANUFACTURING CO.

METAL CUTTING TOOLS

7771 CORTLAND AVENUE • DETROIT 4, MICHIGAN

*Make it a Rule
to Call Motor Tool*

ickness to
h to pre-
s on the
ussed and
860-A gear
n addition.
the three
, together
nd special
ted. Copy

January, 1945

January, 1945

MODERN MACHINE SHOP 397

Over the Editor's Desk

A Happier, if Possible, New Year!

IT becomes pretty difficult to visualize anything like a happy New Year with some eight or ten millions of our boys engaged, actually or potentially, with ruthless and fanatical enemies; with a need developing for several millions more in order that the war may be prosecuted to an early and successful conclusion; with our forces—at the moment—being defeated in the European theatre of war; with the safety of our distant armies in jeopardy due to an imminent shortage of ammunition due to the fact that one million workers have left the war plants in the past few weeks; with our supplies further jeopardized by a continuous succession of strikes in important industries, and with the lid about to be blown off the cost of living by the government's impending abandonment of the Little Steel Formula in order to pay its debt to the Political Action Committee of the CIO for the committee's aid in the recent elections.

A wish for a "happy" New Year doesn't carry much weight when we know that the most difficult part of the war is ahead of us; that the hardest battles are yet to come as the German forces become more concentrated and as the war with the Japs shifts from the seas to the mainland of Asia; that the task of maintaining our supply lines is becoming more difficult, and that the war with Japan may easily go on for two or three years yet.

Our happiness in the New Year will be dampened somewhat by the reflection that if we are to avoid a depression when the war is done, business must provide from seven to ten millions more jobs than were available in 1940, while at the same time the investors who make such jobs possible are being taxed so heavily that they will hesitate to invest in peace-time industries.

The postwar Federal budget will be from 16 to 18 billions of dollars—which is about double the 1939 budget. This is a heavy tax load and must be met, but the question is whether business and industry is to be taxed heavily, thus making industrial expansion difficult if not impossible, or whether the corporate surplus tax shall be removed so that industry will be able to expand and provide the necessary jobs, with every job-holder paying his share of the cost of government.

The one happy thought is that out of all this travail a new world ultimately will be born in which the teachings of the Lowly Carpenter will be recognized as the only foundation for mutual respect, honesty, fair dealing and cooperation between individuals, employees and employers, and nations. When that time comes, "peace on earth" will become a reality, Christmas will have meaning, and every new year will be a happy one.

Howard Campbell